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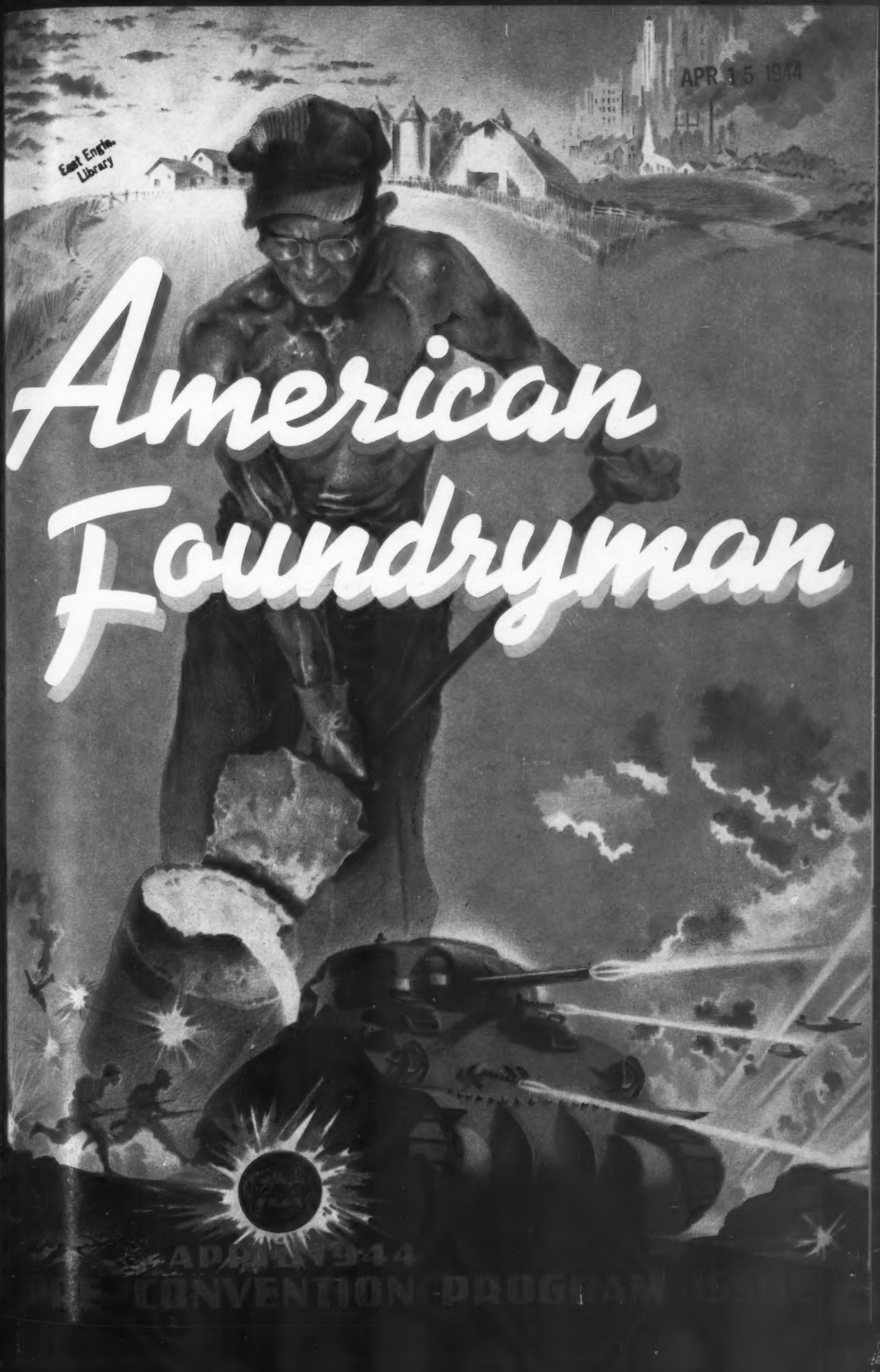

APRIL 1944

CONVENTION PROGRAM

NAVAL RESEARCH LABORATORY
ANACOSTIA STATION
WASHINGTON, D. C.

8 March 1944

L. C. Wilson, President
American Foundrymen's Association,
222 West Adams Street,
Chicago 6, Illinois.

Dear Mr. Wilson:

Thank you for your letters of February 25th and March 1st, 1944 and for the kind invitation to address the Third War Production Foundry Congress. I am pleased to accept this invitation because experience in ship construction makes it possible for me to appreciate fully the tremendous contribution which the foundry industry has made to the present war effort.

I believe the importance of the foundry industry to preparations for war and to the actual prosecution of the present war is clearly indicated by the number of Naval activities conducting research upon its problems. The efforts of such research have been repaid manyfold by the continually improved castings being furnished for various items of war.

The Naval Research Laboratory is dedicated to research in many fields in order to "increase the safety, reliability and efficiency of the United States Fleet by application of scientific research and laboratory experimentation to Naval problems." I am sure the views of the Navy Department coincide with my own in that the Laboratory is fortunate to be able to claim a continued active interest in the foundry field and that the associations with the foundry industry have been mutually beneficial and pleasant. I am looking forward with pleasure to the Congress and Exposition.

Very truly yours,

A.H. Van Keuren,
Rear Admiral, USN,
Director.

A.F.A. OFFICERS

PRESIDENT, L. C. WILSON*
Reading Steel Castings Div.,
American Chain & Cable Co., Inc.,
Reading, Pa.

VICE-PRESIDENT, R. J. TEETOR*
Cadillac Malleable Iron Co.,
Cadillac, Mich.

American Foundryman

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Pittsburgh Lectromelt Furnace Corp.,
Pittsburgh, Pa.

*Members, Executive Committee

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The American Foundrymen's Association is not responsible for statements or opinions advanced by authors of papers printed in its publications.

A.F.A. Stages FOUNDRY CONGRESS and FOUNDRY SHOW in BUFFALO

WARS have occurred from time immemorial. They have always brought death, destruction and economic bankruptcy, the latter generally to the loser. Seldom, however, if ever before, has any conflict had such probability of world-wide economic repercussion as the present World War II. It is quite probable that the loser in this war will be not only bankrupt, but will suffer privations the like of which have never been seen before. It therefore behooves each of us, as a citizen of one of the Allied Nations, to see that we are not the losers.

In wars of antiquity, and even those of less than a century ago, those who "got there firstest with the mostest" were the victors. Such is not necessarily true today, when fire power is the deciding factor. Modern warfare is a science, and the country or countries which develops this science to its highest perfection will be the victor. Men and materials still are important, but the science of modern warfare is dependent, in a large measure, on the practical aids to production and the scientific advancements made in the materials from which weapons are made and which are used to perpetrate the death and destruction necessary to achieve victory.

Congress Aids War Effort

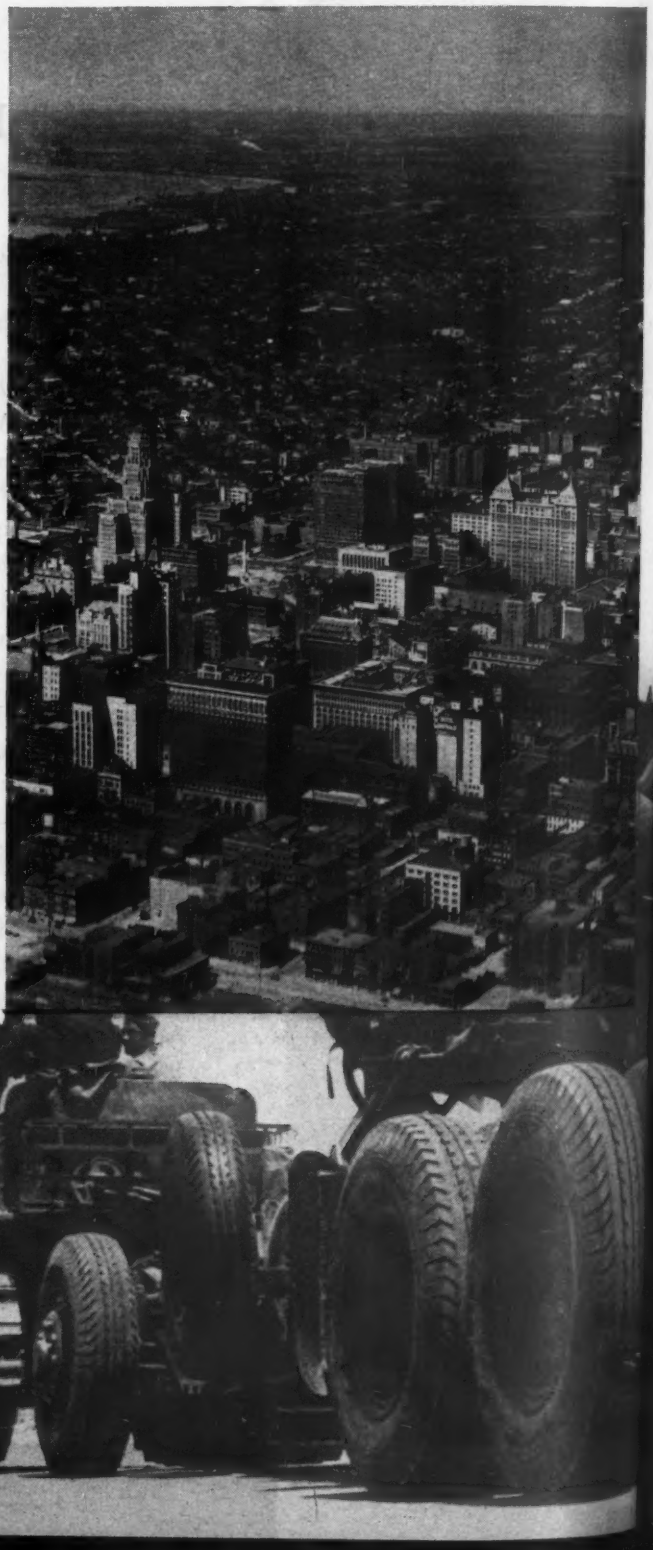
The Third War Production Foundry Congress and Show, sponsored by the American Foundrymen's Association, is staged to acquaint manufacturers of parts, which utilize the casting of metals in their manufacturing processes, with information that will help them attain not only perfection of product, but also quantity production. The technical sessions provide a medium whereby castings manufacturers of all branches of the Foundry Industry may gather and discuss not only current production problems, but also advancements in the arts and sciences of metal casting applicable to their particular branch of the industry. The show provides an opportunity for these same men to see both new and improved products which they may use or adapt to the practices in their own shops.

Never was there a time when an understanding of the technical phases of manufacture was more necessary than at present. Never was there a more opportune time for the American Foundrymen's Association to render service to the castings industry. Our armed forces are dependent on the cast products, and they must be better than our enemies'.

Registration and Headquarters

Activities at the Third War Production Foundry Congress, Buffalo, N. Y., will begin with registration at the Buffalo Memorial Auditorium, which will be the official headquarters for the Congress, at 9:00 a.m. Tuesday, April 25. All attending are urged to register as admission to meetings and exhibit will be by badges secured at the registration desk.

The exhibit, of course, will be housed in the Auditorium, and the majority of technical sessions will be held there. Evening sessions, committee meetings and round table luncheons will be held in Hotel Statler. Those who expect to attend luncheon and dinner meetings staged by the Association are requested to fill out the special form which accompanied the preprint order blank, indicating which of these events they will attend,



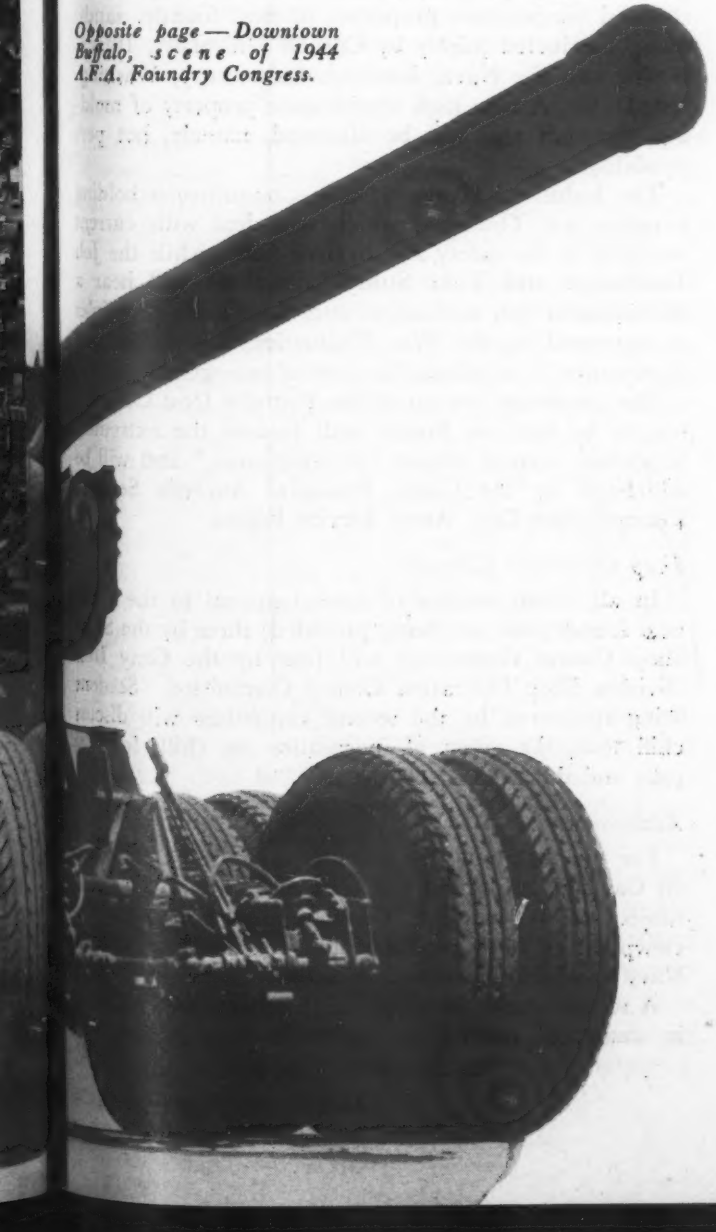
to Advance WAR CASTINGS Production

so that proper arrangements can be made with the hotel to service the dinners and luncheons. Notification should be direct to the National Office, 222 W. Adams St., Chicago, Ill.

Opening Meeting

The technical phase of the Congress will be opened at 10:00 a.m. Tuesday, April 25, at a special session at which President Wilson and Vice-President Teetor will preside. Following the national anthem, President Wilson will officially open the Third War Production Congress and present his presidential address. The Association has been extremely fortunate in securing Rear Admiral A. H. Van Keuren, Director, Naval Research Laboratories, Washington, D. C., to be the opening speaker. Admiral Van Keuren in his present capacity, and in his former work as Chief, Bureau of Ships, U. S. Navy Department, has been keenly interested in the Castings Industry and in its production problems. His intimate knowledge of the industry makes him an ideal speaker for the opening meeting. Following that meeting and the War Production Manpower Session, the technical sessions of the Congress will begin.

Opposite page — Downtown Buffalo, scene of 1944 A.F.A. Foundry Congress.



Technical Program

The technical program, that has been arranged by the Program and Papers Committees of the various Divisions and by the General Interest Committees, is replete with information of current interest on practically every phase of foundry operation. The program has been arranged in such a manner as to keep men away from their plants for the minimum amount of time to take advantage of the opportunities offered.

Sessions of interest to the aluminum and magnesium foundrymen will be held on Tuesday, Wednesday and Thursday, while those of interest to the brass and bronze foundrymen will be held on Wednesday and Thursday. Sessions on gray iron practical and technical developments will be staged on Wednesday and Thursday, with practical shop operation courses on each of the four Congress days. Sessions for steel foundrymen will be held on Wednesday, Thursday and Friday, while malleable iron producers will discuss their problems on Tuesday and Wednesday. Patternmakers will discuss their techniques and developments at a session on Friday. Sessions of general interest are distributed throughout the entire four Congress days. For details of the Technical Program, see pages 6 to 16.

Exhibit Features

With some 240 companies displaying their products and applications of them, the A.F.A. Foundry Show will hold maximum interest for those who attend the Congress. The show this year will, in conformity with requests to conserve shipping space, not be of the heavy operating type. Every effort has been made to make available to foundrymen, information on how the various products displayed may be utilized in stimulating production. The show will open at 9:30 a.m. Tuesday, April 25, and at 9:00 a.m. on the other Congress days. Closing time each day will be 5:30 p.m.

A complete list of 1944 exhibitors will be found on pages 19 and 20 of this issue.

Buffalo Preview Night

On Monday evening, April 24, from 6:00 to 10:00 p.m., the exhibit will be open, and this event has been designated as Buffalo Preview Night. This preview of the exhibit is staged for the benefit of foundrymen in the Western New York area who are unable to attend the Congress during the daytime sessions. In that way, the maximum number of interested foundrymen in that area may have an opportunity to see the advancements and improvements in products used for the production of castings for our armed forces.

Admission to the Preview will be free, on presentation of tickets obtainable through members of the Western New York Chapter's Preview Committee.

Program Highlights

Malleable Iron

The program sponsored by the Malleable Iron Division will highlight, this year, a symposium on gating and risering methods used in the production of malleable iron castings. The symposium will cover two sessions, at which some six papers on this subject will be presented dealing with castings of the automotive, agricultural, railroad and general types.

The third session will consist of papers on a variety of subjects, concerning malleable iron foundry control. The Malleable Division Round Table Conference will discuss current malleable foundry production problems.

Brass and Bronze

The Brass and Bronze Division's program will deal largely with melting problems. Such subjects as cupola melting of non-ferrous metal, the effect of temperature, water vapor and carbon reactions in brass and bronze melting furnaces, and the utilization of cartridge brass by foundries are some of the items to be discussed.

The Round Table Conference, this year, which has been so successful in the past, will feature discussions on melting of brass and bronze alloys in the crucible, cupola, indirect-arc electric, low-frequency induction and high-frequency induction furnaces.

Aluminum and Magnesium

Such subjects as the effect of alloying elements in aluminum casting alloys, microradiography, the cold-chamber die casting process for aluminum alloys, and the need for better quality aircraft castings are some of the subjects to be discussed at the sessions sponsored by the Aluminum and Magnesium Division. A paper on plaster mold properties also is featured.

Also presented at its sessions will be the annual exchange paper of the Institute of British Foundrymen, which is entitled "The Mechanized Production of Gravity Die Castings."

Gray Iron

Several papers of great practical importance will feature the program sponsored by the Gray Iron Division. These include a study of molding methods for producing sound castings, and those used in the production of gray iron cylinders for marine steam engines. A session of interest to metallurgists will be devoted to discussion of inoculation and the effect of superheat on the properties of gray cast iron. The third session, of both practical and metallurgical interest, will feature two discussions, one on cupola operation and the other on gray iron as an engineering material.

Steel Division

The excellent program of the Steel Division will feature four sessions and a round table. The first session will deal with various phases of the control of steel foundry sands; the second with the heat treatment and hardenability of steel castings; the third with properties of steel castings, and the fourth with non-destructive testing.

The Round Table Conference will provide for open discussion of steel foundry problems. Included in the program of the Steel Division is an exchange paper from Brazil.

Patternmaking Division

The Patternmaking Division is sponsoring a single session this year, at which two papers will be presented, one dealing with the use of gypsum cements in pattern and model making, and the other on the necessity for cooperation between foundrymen and patternmakers.

General Interest Sessions

Numerous general interest sessions are scheduled throughout the week. On Tuesday, April 25, a program sponsored by the Foreman Training Committee will be held, while on Wednesday that sponsored by the Committee on Cooperation with Engineering Schools will discuss "Engineers in the Foundry."

The Plant and Plant Equipment Committee is sponsoring a session on Tuesday, where small foundry conveyorization and maintenance of foundry equipment will be discussed. The Refractories Committee session also is to be held on Tuesday, and will deal with insulation, proper drying of foundry ladles, and the use of small bottom pour ladles for steel.

Foundry sand developments will be discussed at a session of the Foundry Sand Research Committee, and will include a progress report on the investigation of elevated temperature properties of steel foundry sands, being conducted jointly by Cornell University, Ithaca, N. Y., and the Naval Research Laboratory, Washington, D. C. A new high temperature property of molding materials also will be discussed, namely, hot permeability.

The Industrial Hygiene Codes Committee is holding a session on Thursday, which will deal with current problems in the safety and hygiene fields, while the Job Evaluation and Time Study Committee will hear a discussion of job evaluation and time study principles as approved by the War Production Board, and the importance of standards in times of emergencies.

The important session of the Foundry Cost Committee, to be held on Friday, will feature the extremely important current subject "Renegotiation," and will be addressed by the Chief, Financial Analysis Section, Renegotiation Div., Army Service Forces.

Shop Operation Courses

In all, seven sessions of special appeal to the practical foundryman are being provided; three by the Sand Shop Course Committee and four by the Gray Iron Division Shop Operation Course Committee. Sessions being sponsored by the second committee will discuss chill tests, the effect of inoculation on chill, foundry coke and the welding of cast iron.

Additional Features

For the first time, the recently organized Committee on Castings Inspection will sponsor a program on that subject on Wednesday. Castings inspection, from the viewpoint of both producer and consumer, as well as Navy standards of inspection, will be discussed.

A session also is provided for those who are interested in analytical control methods. In that session, two

(Continued on page 22)

A.F.A. Prepared to Give Industry Maximum Aid in Difficult Days Ahead

IF THE thought ever existed that the Foundry Industry has become static, or that the industry's progress in the arts and sciences of casting metals has been seemingly slower of development than has been evident upon the surface, the events of the present war period have forever disproved them.

This evidence is upon the record of all branches of the Foundry Industry—non-ferrous, gray iron, malleable, steel and the recent development of aluminum and magnesium castings—that their earnest participation is producing great tonnages of not only familiar classes of castings, but of many new and unfamiliar designs necessitated by the ever changing requirements of the armed services.

Today, more than ever, conditions of changed requirements and specifications make it necessary to draw upon long experience to consolidate new and untried ideas which must produce the desired results immediately. This means that all sources of technical and mechanical information from any source possible must be drawn upon. Such a course is mandatory in face of shrinking experienced manpower of both technically-trained and skilled-trade types.

Foundrymen everywhere have demonstrated by their ingenuity, by their cooperation with government agencies, and by exchange of information among themselves, all in the interest of more dependable castings and better technical control, that they are equal to the task of meeting the emergency of war, for, by so doing, they have released capacities of presses, hammers and machine tools for additional products. Every foundryman is proud of his industry's achievements for his country and its armed forces.

A.F.A. has contributed materially in this effort. Through the work of its Committees and Chapters, it has gathered much needed technical and practical information. This data has been disseminated through published reports, and papers which cover investigations of many technical and practical problems, and through discussions at local and National meetings. Through cooperation with individual foundrymen of all branches of the industry and with the Government agencies in ways too numerous to mention, A.F.A. has disseminated this vital information yet further. Both member and non-member have been served in the interest of the war effort.

While the Foundry Industry is proud of its achievements, it must utilize this consciousness to strive to increase its efforts toward the accomplishment of better products and foundry control. There is much work now and ahead of us. We must furnish great quantities of material for the armed services, for they must never want for our product in their efforts to end this war at the earliest possible moment.

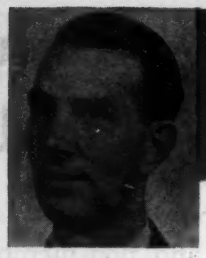
In the midst of this tremendous effort, there is need also to look to the so-called post-war period. Foundrymen must give thought and must take the necessary action, to maintaining and enlarging the technical control of their products. Progress to date must not become static. The lessons of the present should be the basis for an increasingly high quality of castings, so that the industry's products may further increase their services to the public, to the end that the Foundry Industry shall be a better and more necessary Industry than ever before. To reach these goals, the American Foundrymen's Association is prepared to aid to the fullest extent.

L. C. Wilson

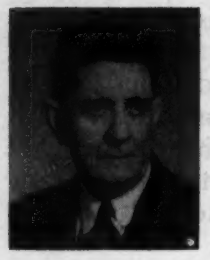
President,
American Foundrymen's Association

Hiram Brown

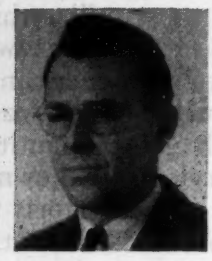
Walter Bonsack



L. W. Ball



F. McCarthy



G. W. Johnson

B. C. Yearley

J. Vickers

Robert Neiman

G. W. Paterson

Victor Patchkis

S. M. Brah

A. J. Klimek

PROGRAM

TUESDAY, APRIL 25

10:00 AM—Opening Session

Presiding—L. C. Wilson, President, American Foundrymen's Association.

Vice-Chairman—R. J. Teetor, Vice-President, American Foundrymen's Association.

National Anthem.

Opening of War Production Congress—By President Wilson.

Welcome—Frank E. Bates, Chairman, Western New York Chapter, A.F.A.

President's Annual Address.

Address by Rear Admiral A. H. Van Keuren, Director, Naval Research Laboratory, Washington, D. C.

11:30 AM—War Production Manpower Session.

Presiding—L. C. Wilson, President, American Foundrymen's Association.

Co-Chairman—R. J. Teetor, Vice-President, American Foundrymen's Association.

Speaker—H. S. Colby, Consultant to Deputy Vice-Chairman for Production, War Production Board, Washington, D. C.

Subject—*"Comments on Selective Program as Developed by War Production Board for the Aid of the Foundry Industry."*

2:00 PM (A)—Aluminum and Magnesium.

(Sponsored by Aluminum and Magnesium Division)

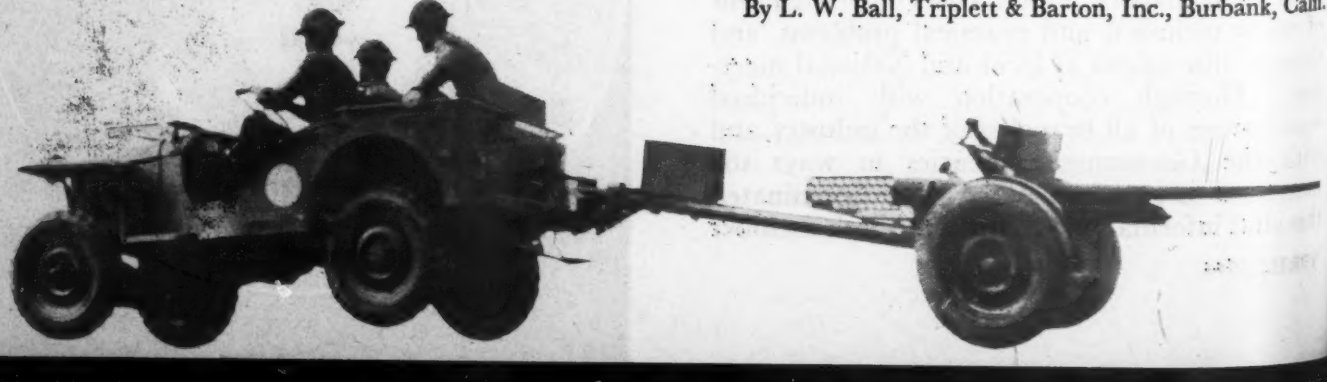
Presiding—Dr. N. E. Woldman, Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.

Co-Chairman—W. E. Martin, Sperry Gyroscope Co., Inc., Flushing, N. Y.

"Effect of Alloying Elements in Aluminum Alloys"—By Walter Bonsack, National Smelting Co., Cleveland, Ohio.

"Natural Aging of Aluminum-Zinc-Magnesium"—By Hiram Brown, Frontier Bronze Corp., Niagara Falls, N. Y.

"Micro-Radiography as a Tool in Foundry Control"—By L. W. Ball, Triplett & Barton, Inc., Burbank, Calif.



1944 War Production Foundry Congress

TUESDAY, APRIL 25 (Cont.)

2:00 PM (B)—Malleable Iron Symposium on Gating and Risering (1st Session).

(Sponsored by Malleable Division)

Presiding—C. F. Joseph, Saginaw Malleable Div., General Motors, Corp., Saginaw, Mich.

"Gating and Feeding Malleable Pipe Fittings" — By M. L. Hawkins, Stockham Pipe Fittings Co., Birmingham, Ala.

"Pattern Planning for Malleable Production"—By E. F. Waterbor, Michigan Malleable Iron Co., Detroit, Mich.

"Gating and Heading Malleable Iron Castings" — By C. C. Lawson, Wagner Malleable Iron Co., Decatur, Ill.

2:00 PM (C)—Plant and Plant Equipment

(Sponsored by Plant & Plant Equipment Committee)

Presiding—James Thomson, Continental Roll & Steel Foundry Co., East Chicago, Ind.

Vice-Chairman—E. A. Swensson, National Engineering Co., Chicago, Ill.

"Some Practical and Economic Aspects of Small Foundry Conveyorization" — By H. B. Nye, New York Air Brake Co., Watertown, N. Y.

"Maintenance and Foundry Equipment"—By F. J. Dost, Sterling Foundry Co., Wellington, Ohio.

2:00 PM (D)—Refractories

(Sponsored by Refractories Committee)

Presiding—J. A. Bowers, American Cast Iron Pipe Co., Birmingham, Ala.

Co-Chairman—E. J. Carmody, Chas. C. Kawin Co., Chicago, Ill.

"High Temperature Heat Insulation"—By G. W. Paterson, Canadian Refractories, Ltd., Montreal, Canada.

"Drying of Foundry Ladles"—By C. E. Bales and F. McCarthy, Ironton Firebrick Co., Ironton, Ohio.

"Pouring Green Sand Steel Molds with the 'Baby' Bottom Pour"—By S. E. McGinty, Firegan Sales Co., Chicago, Ill.

4:00 PM (A)—Solidification and Heat Transfer

Chairman—J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala.

"Introductory Observations on the Rate of Solidification of Malleable Iron"—By B. C. Yearley, R. P. Schauss and P. A. Martin, National Malleable & Steel Castings Co., Cicero, Ill.

"Heat Flow Problems in Foundry Work — Survey Method of Solution and Example" — By Dr. V. Paschkis, Columbia University, New York, N. Y.

"Directionally Controlled Rapid Thermal Dissipation to Obtain Progressive Solidification" — By H. Hagemeyer, Castings Patent Corp., Chicago, Ill.

4:00 PM (B)—Heading and Gating Lecture Course (Session 1).

(Sponsored by Annual Lecture Committee)

Presiding—Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.

Co-Chairman—W. G. Reichert, W. G. Reichert Engineering Co., Newark, N. J.

Subject—*"Gray Iron."*

Discussion Leader—W. W. Levi, Lynchburg Foundry Co., E. Radford, Va.

6:00 PM (A)—Foreman Training Dinner. (Followed by Session at 8 PM).

(Sponsored by Committee on Foreman Training)

R. E. Ward

W. B. George

D. F. Sawtelle

J. H. Shoemaker

John Perkins

C. C. Lawson

K. L. Clark

L. J. Fletcher

PROGRAM

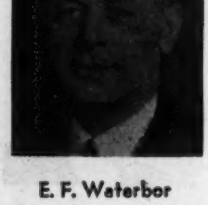
H. M. St. John

W. W. Edens

H. W. Dietert

J. F. Cotton

F. K. Dossett



E. F. Waterbor

L. M. Long

TUESDAY, APRIL 25 (Cont.)

8:00 PM (A)—Gray Iron Shop Course (Session 1).

(Sponsored by Gray Iron Division Chill Test Committee)

Presiding—B. D. Claffey, Gray Iron and Aluminum Div., General Malleable Corp., Waukesha, Wis.
Co-Chairman—P. T. Bancroft, Republic Coal & Coke Co., Moline, Ill.
Subject—*"The Chill Test as a Foundry Control Test."*
Discussion—Members of Gray Iron Division Chill Test Committee.

8:00 PM (B)—Sand Shop Course (Session 1).

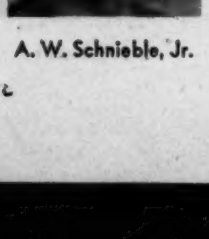
(Sponsored by Sand Shop Course Committee)

Presiding—E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit, Mich.
Subject—*"Dry Core Binders."*
Discussion Leader—W. C. Morgan, E. F. Houghton Co., Detroit, Mich.

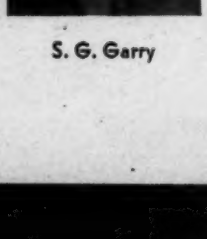
8:00 PM (C)—Foreman Training.

(Sponsored by Committee on Foreman Training)

Presiding—W. G. Conner, Jr., Walworth Co., Washington Park, Ill.
Co-Chairman—W. E. George, Booz, Allen & Hamilton, Chicago, Ill.
"Training of Foremen on the Job"—By F. K. Dossett, Thompson Aircraft Products Co., Cleveland, Ohio.
"Training Foremen to Handle Women"—By W. J. Hebard, Continental Roll & Steel Foundry Co., East Chicago, Ind. (Paper to be presented by F. E. Wartgow, American Steel Foundries, Chicago, Ill.)
"Women as Foremen"—By S. M. Brah, Rustless Iron & Steel Corp., Baltimore, Md.
"The Post-War Foreman"—By T. H. Booth, Walworth Co., Washington Park, Ill.
"Training Foremen Through the Conference Room Method"—By Steven G. Garry, Caterpillar Tractor Co., Peoria, Ill.



A. W. Schnieble, Jr.



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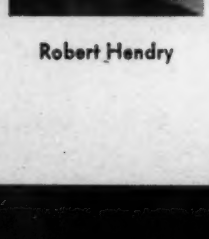
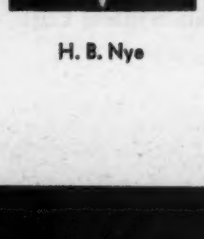


Robert Hendry



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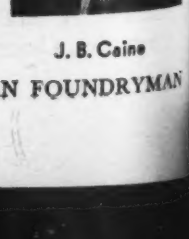


J. B. Caine

1944 War Production Foundry Congress

WEDNESDAY, APRIL 26

9:30 AM (A)—Brass and Bronze.
(Sponsored by Brass and Bronze Division)

Presiding—W. Romanoff, H. Kramer & Co., Chicago, Ill.

Co-Chairman—G. K. Dreher, Ampco Metal, Inc., Milwaukee, Wis.

"Melting Non-Ferrous Metals in the Cupola" — By Leighton M. Long, Leighton M. Long & Associates, Toledo, Ohio.

"Some Causes of Test Bar Failures in Navy G and M Metals"—By W. B. George, R. Lavin & Sons, Chicago, Ill.

9:30 AM (B)—Malleable Iron Symposium on Gating and Risering (2nd Session).
(Sponsored by Malleable Division)

Presiding—H. C. Aufderhaar, Electro Metallurgical Co., Chicago, Ill.

Co-Chairman—J. H. Lansing, Malleable Founders' Society, Cleveland, Ohio.

"Heading and Gating of Malleable Iron Castings"—By A. S. Klimek, Albion Malleable Iron Co., Albion, Mich.

"Gating and Feeding of Malleable Iron Castings"—By A. T. Jeffery, Dayton Malleable Iron Co., Dayton, Ohio.

"Gating and Risering Practice for Heavy Malleable Castings"—By D. I. Dobson, General Malleable Corp., Waukesha, Wis.

9:30 AM (C)—Gray Iron Castings.
(Sponsored by Gray Iron Division)

Presiding—R. J. Allen, Worthington Pump & Machinery Corp., Harrison, N. J.

Co-Chairman—W. A. Hambley, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

"Molding Gray Iron Cylinders by the Four-Part Check Method"—By Robert Hendry, Beloit Iron Works, Beloit, Wis.

"A Study of Molding Methods for Sound Castings"—By F. G. Sefing, International Nickel Co., New York, N. Y.

9:30 AM (D)—Foundry Sand Development.
(Sponsored by Foundry Sand Research Project)

Presiding—Werner Finster, Reading Steel Castings Div., American Chain & Cable Co., Reading, Pa.

Co-Chairman — Dr. H. Ries, Technical Director, Foundry Sand Research Project, Ithaca, N. Y.

"Mold Surface Back Gas Pressure"—By H. W. Dietert, R. L. Doelman and R. W. Bennett, Harry W. Dietert Co., Detroit, Mich.

"Progress Report on Investigation of Elevated Temperature Properties of Steel Foundry Sands"—By D. C. Williams, Cornell University, Ithaca, N. Y.

"Mold Atmosphere Control to Eliminate Metal Penetration and to Improve Casting Surface"—By H. W. Dietert, Harry W. Dietert Co., Detroit, Mich.

11:00 AM—War Production Manpower Session.
(Sponsored by Apprentice Training Committee)

Presiding—C. J. Freund, Dean, University of Detroit, Detroit, Mich.

Co-Chairman—J. G. Goldie, Cleveland Trade School, Cleveland, Ohio.

Subject—*"Post-War Apprenticeship Problems."*

Speaker — Wm. F. Patterson, Director, Apprentice Training Service, Washington, D. C.

12:30 PM (A)—Malleable Round Table Luncheon.
(Sponsored by Malleable Division Round Table Conference Committee)

Presiding—J. H. Lansing, Malleable Founders' Society, Cleveland, Ohio.

Co-Chairman—A. M. Fulton, Northern Malleable Iron Co., St. Paul, Minn.

Co-Chairman—K. H. Hamblin, General Fire Extinguisher Co., Providence, R. I.

Subject—*"Current Malleable Foundry Production Problems."*

Discussion Leaders—Malleable Division Round Table Conference Committee Members.

12:30 PM—Canadian Members' Luncheon.

2:00 PM (A)—Brass and Bronze.
(Sponsored by Brass and Bronze Division)

Presiding—C. O. Thieme, H. Kramer & Co., Chicago, Ill.

"Effect of Temperature, Water Vapor and Carbon Reactions in Brass and Bronze Melting Furnaces"—By H. L. Smith, Federated Metals Div., American Smelting & Refining Co., Barber, N. J.

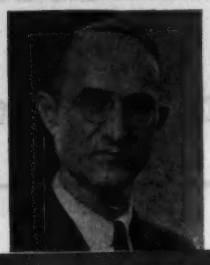
"The Utilization of Cartridge Brass" — By Dr. B. M. Loring, Naval Research Laboratory, Washington, D. C.

2:00 PM (B)—Steel Foundry Sands.
(Sponsored by Steel Division)

Presiding — D. L. Parker, General Electric Co., Revere, Mass.

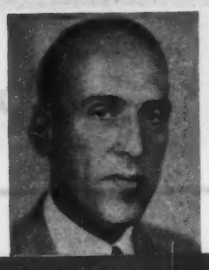
H. F. Bishop

J. Hino



H. W. Bruckner

D. I. Dobson



M. E. McKinney

R. W. Parson

PROGRAM

1944 WAR PRODUCTION FOUNDRY CONGRESS

H. F. Taylor

W. J. Hebard

H. F. Kincaid

F. L. Wolf

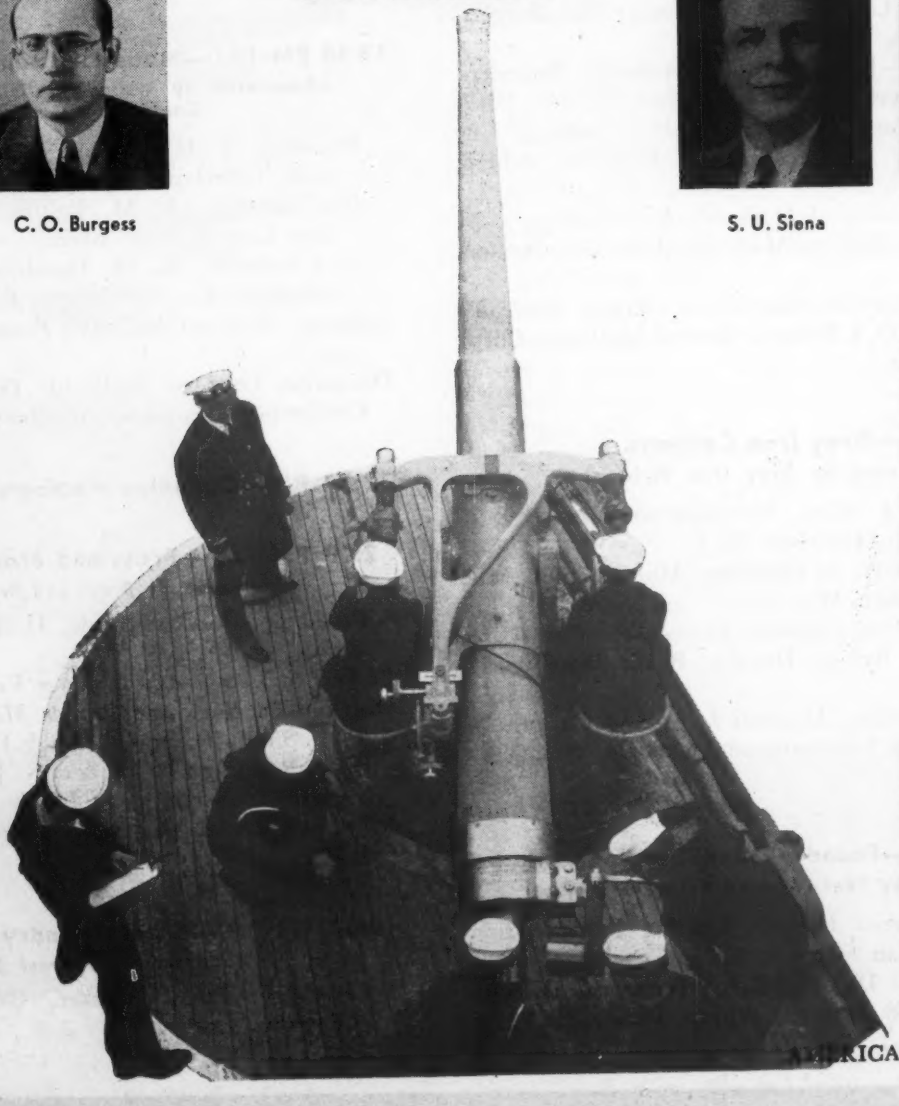
H. L. Smith

C. O. Burgess

S. U. Siena

R. G. McElwee

M. C. Udy



R. E. Morey

F. J. Dost

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WEDNESDAY, APRIL 26 (Cont.)

"The Cumulative Curve in Foundry Sand Control"—By R. E. Morey and H. F. Taylor, Naval Research Laboratory, Washington, D. C.

"Operating Properties of Steel Foundry Sands" — By Harry W. Dietert, Harry W. Dietert Co., Detroit, Mich.

"Reproducibility of Elevated Temperature Sand Test Results"—By John A. Rassenfoss, American Steel Foundries, East Chicago, Ind.

2:00 PM (C)—Gray Iron.

(Sponsored by Gray Iron Division)

Presiding—Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.

Co-Chairman—A. J. Edgar, Gray Iron Founders' Society, Cleveland, Ohio.

"Cupola Operation"—By E. E. Marbaker, Mellon Institute, Pittsburgh, Pa.

"A Discussion of Engineering Properties of Gray Cast Iron"—By R. G. McElwee, Vanadium Corp. of America, Detroit, Mich.

2:00 PM (D)—Inspection of Castings.

(Sponsored by Castings Inspection Committee)

Presiding—M. D. Johnson, Caterpillar Tractor Co., Peoria, Ill.

Vice-Chairman—H. W. Warner, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

"The Consumers' Viewpoint on Castings" — By L. A. Danse, General Motors Corp., Detroit, Mich.

"Some Aspects of Casting Inspection as Seen by a Purchasing Agent"—By R. V. Elms, Sperry Gyroscope Co., Inc., Brooklyn, N. Y.

"Navy Inspection Standards"—By C. L. Frear, Bureau of Ships, U. S. Navy Yard, Washington, D. C.

Summarizer—E. F. Platt, Sperry Gyroscope Co., Inc., Brooklyn, N. Y.

3:00 PM (A)—Malleable Iron Founding.

(Sponsored by Malleable Division)

Presiding—A. M. Fulton, Northern Malleable Iron Co., St. Paul, Minn.

Co-Chairman—Fred L. Wolf, Ross Tacony Crucible Co., Tacony, Philadelphia, Pa.

"Pulverized Coal Firing of Malleable Iron Annealing and Melting Furnaces"—By D. F. Sawtelle, Malleable Iron Fittings Co., Branford, Conn., and L. E. Wilcoxson, Babcock & Wilcox Co., Barberton, Ohio.

"Malleable Mixture Calculation and Melting Control" —By M. E. McKinney, International Harvester Co., Ltd., Hamilton, Ontario, Canada.

"A Metallographic Quality Test for Malleable Iron"—By C. T. Eakin and H. W. Lownie, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Coin Pressing of Malleable Castings"—By C. C. Lawson, Wagner Malleable Iron Co., Decatur, Ill.

"Rate of Spheroidization and Physical Properties of Pearlitic Malleable Iron After Isothermal Quenching"—By W. H. Bruckner and J. Hino, University of Illinois, Urbana, Ill.

4:00 PM (A)—Heading and Gating Course (Session 2).

(Sponsored by Annual Lecture Committee)

Presiding—K. V. Wheeler, American Steel Castings, Newark, N. J.

Co-Chairman—W. G. Reichert, W. G. Reichert Engineering Co., Newark, N. J.

Subject—*"Steel."*

Discussion Leader—Howard F. Taylor, Naval Research Laboratory, Washington, D. C.

4:00 PM (B)—Aluminum and Magnesium.

(Sponsored by Aluminum and Magnesium Division)

Presiding — R. E. Ward, Bendix Aviation Corp., Teterboro, N. J.

Co-Chairman—A. T. Ruppe, Bendix Products Corp., South Bend, Ind.

"The Mechanized Production of Gravity Die Castings" —By J. Vickers, Rolls-Royce Co., England (Official Exchange Paper of Institute of British Foundrymen).

Honorary Presenter—H. S. Royce, British Air Commission, Washington, D. C.

Technical Presentation by A. Sugar, U. S. Metal Refining Co., Cartaret, N. J.

"Apparatus and Method of Measuring Relative Permeability in Dense Mold Materials"—By John Neff, Research Dept., U. S. Gypsum Co., Chicago, Ill.

4:00 PM (C)—Chapter Delegate Meeting.

Presiding—R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.

Co-Chairman—F. J. Walls, International Nickel Co., Detroit, Mich.

6:00 PM (A)—Chapter Officers' Dinner.

Presiding—R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.

Co-Chairman—F. J. Walls, International Nickel Co., Detroit, Mich.

6:30 PM (A)—Foundry Instructors' Dinner

(Sponsored by Committee on Cooperation with Engineering Schools)

8:00 PM (A)—Gray Iron Shop Course (Session 2).

(Sponsored by Gray Iron Division Chill Test Committee)

Presiding—K. H. Priestley, Eaton Mfg. Co., Vassar, Mich.

Co-Chairman—P. T. Bancroft, Republic Coal & Coke Co., Moline, Ill.

Subject—*"Inoculating Alloys and Effects on Chill Control."*

Discussion Leaders—T. E. Barlow, Battelle Memorial Institute, Columbus, Ohio.

1944 War Production Foundry Congress

WEDNESDAY, APRIL 26 (Cont.)

8:00 PM (B)—Sand Shop Course (Session 2).

(Sponsored by Sand Shop Course Committee)

Presiding—D. F. Sawtelle, Malleable Iron Fittings Co., Branford, Conn.

Co-Chairman—R. H. Jacoby, Key Co., East St. Louis, Ill.

Subject—*"Sand Problems."*

Discussion Leader—E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit, Mich.

8:00 PM (C)—Analytical Methods for Cast Metals.

Presiding—C. O. Burgess, Union Carbide & Carbon Research Laboratories, Niagara Falls, N. Y.

"Spectrographic Equipment for Foundry Metal Control"—By H. W. Dietert and John Schuch, Harry W. Dietert Co., Detroit, Mich.

"Spectrographic Analysis of Iron and Steel"—By H. F. Kincaid, Spectrographer, International Harvester Co., Rock Island, Ill.

"A Combined Method of Analysis for Unalloyed and Alloyed Iron and Steel"—By W. B. Sobers, Chain Belt Co., Milwaukee, Wis.

8:00 PM (D)—Engineers in the Foundry.

(Sponsored by Committee on Cooperation with Engineering Schools)

Presiding—C. V. Nass, Pettibone Mulliken Co., Chicago, Ill.

"Engineers in the Foundry"—By L. J. Fletcher, Caterpillar Tractor Co., Peoria, Ill.

"Employment of Technical Graduates in the Foundry Industry"—By C. L. Heater, American Steel Foundries, Chicago, Ill.

THURSDAY, APRIL 27

9:30 AM—Annual Business and Awards Meeting.

Presiding—L. C. Wilson, President, American Foundrymen's Association.

Vice-Chairman—R. J. Teetor, Vice-President, American Foundrymen's Association.

Report of Officers.

Report of Election of Officers.

Medal and Life Membership Awards.

A.F.A. Foundation Lecture—*"Cupola Raw Materials"*—Presented by H. W. Gillett, Battelle Memorial Institute, Columbus, Ohio.

12:30 PM—Brass and Bronze Round Table Luncheon.

(Sponsored by Brass and Bronze Division Round Table Conference Committee)

Presiding—B. A. Miller, Cramp Brass & Iron Foundries Div., Baldwin Locomotive Works, Philadelphia.

Co-Chairman—W. Romanoff, H. Kramer & Co., Chicago, Ill.

Subject—*"Brass and Bronze Melting."*

"Melting in the Crucible Furnace"—By Fred L. Wolf, Ross-Tacony Crucible Co., Philadelphia, Pa.

"Melting Non-Ferrous Metals in the Cupola Furnace"—By Leighton M. Long, Leighton M. Long and Associates, Toledo, Ohio.

"Melting in the Arc-Type Electric Furnace"—By H. M. St. John, Crane Co., Chicago, Ill.

"Melting in Low-frequency Induction Furnace"—By Henry Gieseke, The Ajax Metal Co., Philadelphia, Pa.

"Melting in High-frequency Induction Furnace"—By Frank T. Chestnut, The Ajax Metal Co., Philadelphia.

Summarization—By R. W. Parsons, Ohio Brass Co., Mansfield, Ohio.

2:00 PM (A)—Aluminum and Magnesium.

(Sponsored by Aluminum and Magnesium Division)

Presiding—L. Brown, Magnesium Fabricators Div., Bohn Aluminum & Brass Corp., Adrian, Mich.

Co-Chairman—J. C. Fox, Doehler Die Casting Co., Toledo, Ohio.

"Die Casting of Aluminum Alloys by the Cold Chamber Process"—By S. U. Siena, Sperry Gyroscope Co., Brooklyn, N. Y.

"Need for Better Quality Aircraft Castings"—By R. E. Ward, Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.

(Continued on Page 14)

The following message is from Rear Admiral E. L. Cochrane, Chief, Bureau of Ships, Navy Department, to whom is entrusted the vital responsibility for design, construction and maintenance of Naval vessels . . . the fighting ships upon which Victory in a world-wide war largely depends.

THE part which the American foundry industry has played in building and maintaining our fighting Navy, by all standards the most formidable in the history of sea power, is highly deserving of commendation.

The Navy requires large numbers of castings . . . in fact, castings constitute about 5 per cent of the total weight of each ship constructed. To fulfill their role as important parts of the hull structure and vital units of machinery installations, it is essential that these castings be made to high standards.

It is the duty of the Navy to see to it that U. S. Navy ships are superior to those of the enemy. To this end, all component parts entering into their construction must likewise be superior. It follows, therefore, that it is the duty of every man in the foundry industry to do his utmost to insure that the Navy gets castings that are wholly adequate to meet the most severe demands of battle.

The Navy Department, through its research and engineering laboratories, has been actively cooperating with the foundry industry for a number of years, developing procedures and material for making better castings. This has been a venture of mutual effort and has resulted in mutual advantage to both industry and the Navy. The Navy Department has freely given the results of its research and foundry developments to the industry, through the American Foundrymen's Association, and welcomes suggestions from its members for improvements or future research.

I feel confident that the foundries will continue to give their active cooperation in delivering the goods for our Fleet, so that our fighting men can finish the job they still have before them.

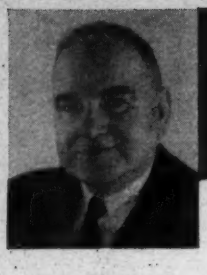
E. L. Cochrane

Rear Admiral, U. S. Navy.

PROGRAM

J. A. Duma

Ensign K. C. Wayne



Peter Blackwod

J. A. Rassenfoss

Kenneth Grube

John Schuch

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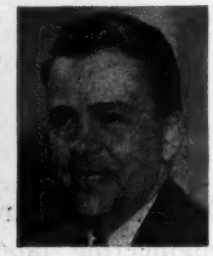


R. V. Elms

C. T. Greenidge

H. B. Voorhees

Paul Ffield

THURSDAY, APRIL 27

(Continued from Page 12)

2:00 PM (B)—Hardenability and Heat Treatment of Steel Castings.

(Sponsored by Steel Division)

Presiding—H. D. Phillips, Lebanon Steel Foundry, Lebanon, Pa.

Co-Chairman—C. H. Lorig, Battelle Memorial Institute, Columbus, Ohio.

"Hardenability of Some Cast Steels"—By J. B. Caine, Sawbrook Steel Castings Co., Lockland, Cincinnati.

"Hardenability and the Steel Casting"—By K. L. Clark and J. H. Richards, Naval Research Laboratory, Washington, D. C.

"The Effect of Copper in Some NE and Low-Alloy Cast Steels"—By C. T. Greenidge, M. C. Udy and K. Grube, Battelle Memorial Institute, Columbus, Ohio.

"Problems Encountered in Making and Heat Treating Castings of an Air Hardening Steel"—By Gordon W. Johnson, American Hoist & Derrick Co., St. Paul, Minn.

"Progress Report of Committee on Heat Treatment of Steel Castings"—By E. R. Young, Climax Molybdenum Co., Chicago; Chairman.

2:00 PM (C)—Gray Iron Foundry Practice.

(Sponsored by Gray Iron Division)

Presiding—John Bolton, The Lunkenheimer Co., Cincinnati, Ohio.

Co-Chairman—W. E. Mahin, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Alterations in Cast Iron Properties Accompanying the Use of a Strong Inoculant of the Silicon-Manganese-Zirconium Type"—By C. O. Burgess, Union Carbide and Carbon Research Laboratories, Niagara Falls.

Lt. Com. L. B. Knight

1944 War Production Foundry Congress

"Factors Involved in Superheating Gray Cast Iron and Their Effects on Structure and Properties"—By A. W. Schneble, Advance Foundry Co., Dayton, Ohio, and John Chipman, Massachusetts Institute of Technology, Cambridge, Mass.

"Preparing Cast Iron for Subsequent Processing"—By J. H. Shoemaker, Kolene Corp., Detroit, Mich.

"Investigation of Graphite Formation"—By Dr. J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala.

2:00 PM (D)—Safety and Hygiene.
(Sponsored by Industrial Hygiene Codes Committee)

Presiding—James R. Allan, International Harvester Co., Chicago, Ill.

4:00 PM (A)—Heading and Gating Lecture Course (Session 3).
(Sponsored by Annual Lecture Committee)

Presiding—A. McIntosh, Wright Aeronautical Corporation, Paterson, N. J.

Subject—*"Aluminum and Magnesium."*

Discussion Leader—R. E. Ward, Eclipse-Pioneer Div., Bendix Aviation Corp., Bendix, N. J.

4:00 PM (B)—Centrifugal Casting Symposium (Session 1).

Presiding—A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Co-Chairman — Nathan Janco, Centrifugal Casting Machine Co., Tulsa, Okla.

"Beneficial Effect of Centrifugal Casting upon Heavy Non-Ferrous Alloys" — By W. W. Edens, Ampco Metal, Inc., Milwaukee, Wis.

"Calculations and Devices Involved in the Operation of Small Centrifugal Casting Machines" — By Jack Weber, Ampco Metal, Inc., Milwaukee, Wis.

"Centrifugal Casting of Non-Ferrous Metals"—By I. E. Cox, National Bearing Metals Co., St. Louis, Mo.

"Precision Castings by the Investment Molding Process" —By Robert Neiman, Whip-Mix Corp., Louisville, Ky.

4:00 PM (C)—Properties of Steel Castings.
(Sponsored by Steel Division)

Presiding—L. C. Wilson, Reading Steel Casting Div., American Chain & Cable Co., Reading, Pa.

Co-Chairman—T. N. Armstrong, International Nickel Co., Inc., New York, N. Y.

"Properties and Advantages of Low-Alloy, Low-Carbon, Copper Bearing Cast Steels"—By H. F. Taylor and H. F. Bishop, Naval Research Laboratory, Washington, D. C.

"Low Carbon Steel for Castings"—By C. J. Lutts and J. P. Hickey, U. S. Navy Yard, Boston, Mass.

"Notes on Recent Steel Casting Developments" — By S. W. Brinson and J. A. Duma, Norfolk Navy Yard, Portsmouth, Va.

"Test Bar Molds for Steel Castings"—By H. F. Bishop and R. C. Wayne, Naval Research Laboratory, Washington, D. C.

"Report of Committee on Methods of Producing Steel for Castings" — By C. E. Sims, Battelle Memorial Institute, Columbus, Ohio; Chairman.

8:00 PM (A)—Job Evaluation and Time Study.
(Sponsored by Job Evaluation & Time Study Committee)

Presiding—F. E. Wartgow, American Steel Foundries, Chicago.

"Job Evaluation and Time Study Principles as Approved by W.P.B." — By John W. Nickerson, Director of Management Consultant Div., War Production Board, Washington, D. C.

"Standards in Times of Emergency"—By Phil Carroll, Maplewood, N. J. (Presented by F. E. Wartgow for discussion.)

"Job Evaluation"—General Discussion by Committee.

8:00 PM (B)—Gray Iron Shop Course (Session 3).
(Sponsored by Gray Iron Division Shop Operation Course Committee)

Presiding—E. J. Burke, Hickman Williams & Co., Detroit, Mich.

Co-Chairman—P. T. Bancroft, Republic Coal & Coke Co., Moline, Ill.

Subject—*"Foundry Coke—A Critical Study."*

Discusion Leader—B. P. Mulcahy, Citizens' Gas and Coke Utility, Indianapolis, Ind.

8:00 PM (C)—Sand Shop Course (Session 3).
(Sponsored by Sand Shop Course Committee)

Presiding—E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit, Mich.

Co-Chairman—Charles Fuerst, The Falk Corporation, Milwaukee, Wis.

Subject—*"Application of Mold and Core Protections."*

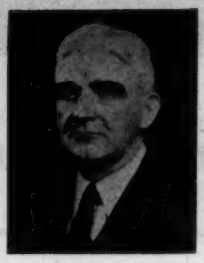
Discussion Leader—J. A. Gitzen, Delta Oil Products Co., Milwaukee, Wis.

W. C. Morgan

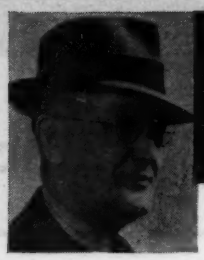
F. T. Chestnut

T. H. Booth

A. F. Hagemeyer



F. G. Carrington



C. J. Lutts

PROGRAM

FRIDAY, APRIL 28

9:30 AM (A)—Non-Destructive Testing of Steel Castings.

(Sponsored by Steel Division)

Presiding—R. A. Gezelius, General Steel Castings Corp., Eddystone, Pa.

Co-Chairman—C. W. Briggs, Steel Founders' Society of America, Cleveland, Ohio.

"Conditioning of Steel Castings to Standards of Quality"—By Paul Ffield, Bethlehem Steel Co., Quincy, Mass.

"Magnetic Powder Inspection of Large Castings"—By John F. Cotton, Bethlehem Steel Co., Steelton, Pa.

"Report of Committee on Non-Destructive Testing"—By C. W. Briggs, Steel Founders Society of America, Cleveland, Ohio.

"The Effect of Copper on the Properties of Cast Carbon-Molybdenum Steels" — By N. A. Ziegler and W. L. Meinhart, Crane Co., Chicago.

"Brazil Produces Steel Castings to Replace Forgings and Fabricated Parts" — By H. Zimnawoda, Sao Paulo, Brazil. (Presented by J. S. Vanick, International Nickel Co., New York, N. Y.)

9:30 AM (B)—Patternmaking.

(Sponsored by Patternmaking Division)

Presiding—Vaughan Reid, City Pattern Foundry & Machine Co., Detroit, Mich.

Co-Chairman—F. C. Cech, Cleveland Trade School, Cleveland, Ohio.

"The Use of Gypsum Cements in Pattern and Model Making"—By J. S. Offutt, U. S. Gypsum Co., Chicago.

"Cooperation Between Foundrymen and Patternmakers"—By L. F. Tucker, City Pattern Works, South Bend, Ind.

9:30 AM (C)—Heading and Gating Lecture Course (Session 4).

(Sponsored by Annual Lecture Committee)

Presiding—J. E. Crown, U. S. Navy Yard, Washington, D. C.

Co-Chairman—W. G. Reichert, W. G. Reichert Engineering Co., Newark, N. J.

Subject—*"Brass and Bronze."*

Discussion Leader—W. B. George, R. Lavin & Sons, Inc., Chicago.

12:30 PM (A)—Steel Division Round Table Luncheon.

(Sponsored by Steel Division Round Table Conference Committee)

Presiding — T. D. West, West Steel Castings Co., Cleveland, Ohio.

Vice-Chairman—R. S. Munson, Atlantic Steel Casting Co., Chester, Pa.

Subject—*"General Discussion."*

Leaders — John Howe Hall, General Steel Castings Corp., Eddystone, Pa.; G. A. Lillieqvist, American Steel Foundries, East Chicago, Ind.; A. H. Jameson, Malleable Iron Fittings Co., Branford, Conn.

2:00 PM (A)—Foundry Costs.

(Sponsored by Foundry Cost Committee)

Presiding—R. L. Lee, Grede Foundries, Inc., Milwaukee, Wis.

Co-Chairman—E. W. Horlebein, Gibson & Kirk Co., Baltimore, Md.

Subject—*"Renegotiation in the Foundry."*

Speaker — Major Stephen B. Ives, Chief, Financial Analysis Section of the Renegotiation Div., Army Service Forces, Washington, D. C.

2:00 PM (B)—Gray Iron Shop Course (Session 4).

(Sponsored by Gray Iron Division Shop Operation Course Committee)

Presiding — H. H. Wilder, Vanadium Corp. of America, Detroit, Mich.

Co-Chairman—P. T. Bancroft, Republic Coal & Coke Co., Moline, Ill.

Subject—*"Welding Cast Iron."*

Discussion Leader—F. J. Walls, International Nickel Co., Detroit, Mich.

3:00 PM (A)—Centrifugal Casting Symposium (Steel) (Session 2).

Presiding—Dr. A. E. Schuh, U. S. Pipe & Foundry Co., Burlington, N. J.

Co-Chairman—J. B. Caine, Sawbrook Steel Casting Co., Lockland, Ohio.

"Centrifugal Castings"—By Peter Blackwood and John Perkins, Ford Motor Co. of Canada, Ltd., Windsor, Ontario, Canada.

"Centrifugal Casting of Steel" — By C. K. Donoho, American Cast Iron Pipe Co., Birmingham, Ala.

"Spinning Speeds of Centrifugal Casting Machines"—By F. G. Carrington, Lynchburg Foundry Co., Lynchburg, Va.

7:00 PM—Annual Dinner.

Presiding—L. C. Wilson, President, American Foundrymen's Association.

Vice-Chairman—R. J. Teetor, Vice-President, American Foundrymen's Association.

Speaker—"Colonel" Jack Major.

Subject—*"With Our Boys in the South Pacific."*

"A Bridge of Ships" . . .

The Job of the Maritime Commission in Helping to Win the War

The following message was received from Rear Admiral Emory S. Land, U.S.N. (Retired), Chairman of the U. S. Maritime Commission, and War Shipping Administrator.

E S Land

THE statement made soon after Pearl Harbor that this is a war of transportation—a war of ships—still holds. Battles are won by men, equipment and supplies. But all three of these are useless without transportation to deliver them to the theaters of action in sufficient force and on time.

Stopping the advance of the enemy has depended upon hundreds of ships for the American Merchant Marine being built in a short period of time. During 1942 and 1943, 2,642 vessels of 27,328,358 dwt. tons were delivered to the Maritime Commission. That is a world record in ship production.

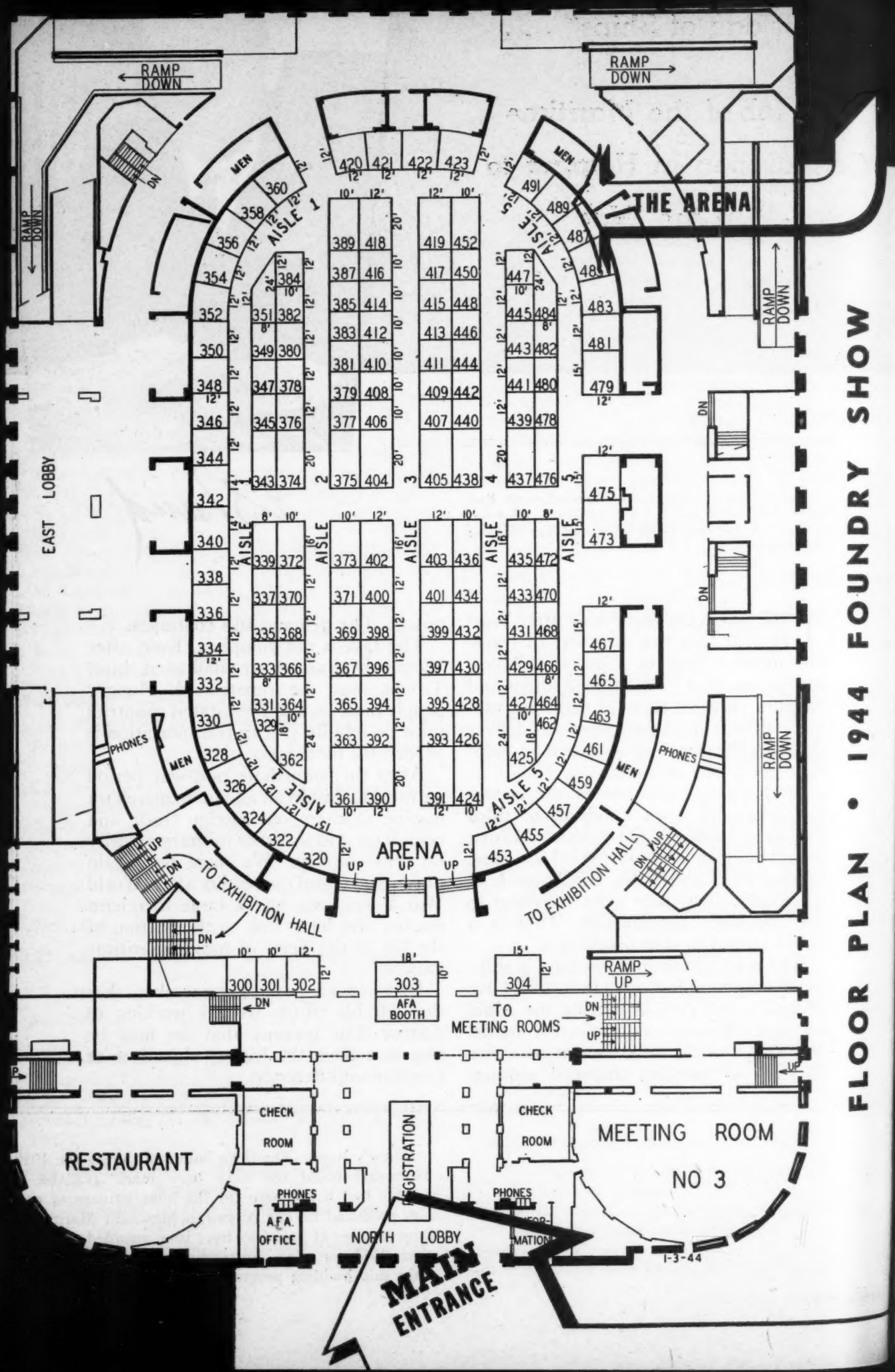
The men and women working in shipyards and manufacturing industries have played a real part in putting the Allies on the offensive side of the battle. Workers in mills and factories are doing the job of meeting shipyard requirements. The demand still continues.

The task is not complete. Even after Victory is attained, we shall need ships. Troops must be repatriated. Hungry people must be fed. Devastated countries must be rebuilt. Ocean transportation is needed for these tasks.

After the immediate post-war period we must maintain an adequate merchant marine to carry out foreign trade and commerce and to assure military security for this country. We must not again make the mistakes we did after World War I when we had a large merchant marine and let it sink to the bottom of the list of the fleets of major maritime nations.

Every worker must remember that through his efforts we are working to destroy Axis tyranny that we may be free to pursue the higher objectives of freedom and decency.

Editor's Note: The ships launched during the 1942-43 period could not have been made available so quickly had it not been for the huge tonnage of castings produced for the American Merchant Marine. A large number of foundries have been awarded the Maritime "M" for their outstanding contributions to this huge ship building program.


FLOOR PLAN • 1944 FOUNDRY SHOW
THE ARENA
ARENA
RAMP DOWN
RAMP UP
MEN
PHONES
EAST LOBBY
AISLE 1
AISLE 2
AISLE 3
AISLE 4
AISLE 5
TO EXHIBITION HALL
TO MEETING ROOMS
AFA BOOTH
CHECK ROOM
CHECK ROOM
RESTAURANT
MEETING ROOM NO 3
REGISTRATION
A.F.A. OFFICE
NORTH LOBBY
MAIN ENTRANCE
1-3-44

LIST OF 1944 EXHIBITORS

A.F.A. FOUNDRY SHOW • BUFFALO, N. Y.

Adams Company.....Dubuque, Iowa
Air Reduction Sales Co.....New York
Ajax Electrothermic Corp.....Trenton, N. J.
Ajax Engineering Corp.....Trenton, N. J.
Ajax Flexible Coupling Co.....Westfield, N. Y.
Ajax Metal Co.....Philadelphia
American Air Filter Co., Inc.....Louisville, Ky.
American Allsafe Co., Inc.....Buffalo
American Crucible Co.....Shelton, Conn.
American Foundry Equipment Co.....Mishawaka, Ind.
American Optical Co.....New York
American Photocopy Equipment Co.....Chicago
American Steel Abrasives Co.....Galion, Ohio
Arcade Mfg. Co.....Freeport, Ill.
Asbury Graphite Mills, Inc.....Asbury, N. J.
Automatic Transportation Co.....Chicago
Ayers Mineral Co.....Zanesville, Ohio

Baker Perkins Inc.....Saginaw, Mich.
C. O. Bartlett & Snow Co.....Cleveland
Beardsley & Piper Co.....Chicago
Black, Sivalls & Bryson, Inc.....Kansas City, Mo.
Blaw-Knox Div., Blaw-Knox Co.....Pittsburgh, Pa.
Bloomsbury Graphite Co.....Bloomsbury, N. J.
Blystone Div., Standard Sand & Machine Co.....Chicago
Bradley Washfountain Co.....Milwaukee
Brickseal Refractory Co.....Hoboken, N. J.
Briggs Mfg. Co.....Cleveland
Buckeye Products Co.....Cincinnati
Adolph I. Buehler.....Chicago
Buell Engineering Co., Inc.....New York
Buffalo Forge Co.....Buffalo

Campbell-Hausfeld Co.....Harrison, Ohio
Canadian Radium & Uranium Corp.....New York
Certified Core Oil & Mfg. Co.....Cicero, Ill.
Chain Belt Co.....Milawukee
Champion Foundry & Machine Co.....Chicago
Chicago Pneumatic Tool Co.....New York
Clearfield Machine Co.....Clearfield, Pa.
Cleveland Pneumatic Tool Co.....Cleveland
Cleveland Quarries Co.....Cleveland
Climax Molybdenum Co.....New York
L. S. Cohen & Co., Inc.....Chicago
L. A. Cohn & Bro., Inc.....Cicero, Ill.
Columbus McKinnon Chain Corp.....Tonawanda, N. Y.
Combined Supply & Equipment Co. Inc.....Buffalo
Conco Eng. Works, Div. H. D. Conkey & Co., Mendota, Ill.
Conover Engineering Co.....Cleveland
Corn Products Sales Co.....New York

Daily Metal Reporter.....New York
Davenport Machine & Foundry Co.....Davenport, Iowa
Dayton Oil Co.....Dayton, Ohio
Delta Oil Products Co.....Milwaukee
Wm. Demmler & Bros.....Kewanee, Ill.
Despatch Oven Co.....Minneapolis
Detroit Electric Furnace Div., Kuhlman Electric Co.....Bay City, Mich.
De Walt Products Corp.....Lancaster, Pa.
Harry W. Dietert Co.....Detroit
Joseph Dixon Crucible Co.....Jersey City, N. J.
Dougherty Lumber Co.....Cleveland

Allen B. Du Mont Laboratories, Inc.....Passaic, N. J.
Duquesne Smelting Corp.....Pittsburgh, Pa.

Eastern Clay Products, Inc.....Eifort, Ohio
Eastman Kodak Co.....Rochester, N. Y.
Electro Metallurgical Co.....New York
Electro Refractories & Alloys Corp.....Buffalo
Elwell-Parker Electric Co.....Cleveland
Engineering Sales Co.....Sheboygan, Wis.
Eutectic Welding Alloys Co.....New York

Federal Foundry Supply Co.....Cleveland
Federated Metals Div., American Smelting & Refining Co.....New York
Fisher Furnace Co.....Chicago
Foundry Equipment Co.....Cleveland
Foxboro Co.....Foxboro, Mass.
Fox Grinders, Inc.....Pittsburgh, Pa.
The Foundry.....Cleveland
Freeman Supply Co.....Toledo, Ohio
Fremont Flask Co.....Fremont, Ohio
Frontier Bronze Corp.....Niagara Falls, N. Y.

Gamma Instrument Co., Inc.....New York
General Electric X-Ray Corp.....Chicago
Globe Steel Abrasive Co.....Mansfield, Ohio
Great Lakes Foundry Sand Co.....Detroit
Great Western Mfg. Co.....Leavenworth, Kan.
Samuel Greenfield Co., Inc.....Buffalo

Hanna Furnace Corp.....Detroit
Hardy Sand Co.....Evansville, Ind.
Benjamin Harris & Co.....Chicago Heights, Ill.
Hercules Powder Co.....Wilmington, Del.
Herman Pneumatic Machine Co.....Pittsburgh, Pa.
Hickman, Williams & Co., Inc.....Cincinnati
Hill & Griffith Co.....Cincinnati
Hines Flask Co.....Cleveland
Hoffman Foundry Supply Co.....Cleveland
E. F. Houghton & Co.....Philadelphia
Hougland & Hardy, Inc.....Evansville, Ind.
Hudson Foundry Machine Co., Inc.....Buffalo
Hydro-Blast Corp.....Chicago

Illinois Clay Products Co.....Joliet, Ill.
Illinois Testing Laboratories, Inc.....Chicago
Independent Pneumatic Tool Co.....Chicago
Industrial Minerals Co.....Lancaster, Ohio
Industrial Silica Co.....Youngstown, Ohio
Ingersoll-Rand Co.....New York
Insto-Gas Corp.....Detroit
International Graphite & Electrode Corp.....St. Marys, Pa.
International Molding Machine Co.....Chicago
International Nickel Co., Inc.....New York
Ironton Fire Brick Co.....Ironton, Ohio

Jackson & Church Co.....Saginaw, Mich.
Jeffrey Mfg. Co.....Columbus, Ohio
Johnston & Jennings Co.....Cleveland

Kindt-Collins Co.....Cleveland
Kolene Corp.....Detroit
H. Kramer & Co.....Chicago

Lancaster Iron Works, Inc.....Lancaster, Pa.
Lava Crucible Co. of Pittsburgh.....Pittsburgh, Pa.

(Continued on next page)

LIST OF 1944 EXHIBITORS

(Continued from previous page)

R. Lavin & Sons, Inc. ..... Chicago
Lift Trucks, Inc. ..... Cincinnati
Link-Belt Co. ..... Chicago

J. S. McCormick Co. ..... Pittsburgh, Pa.
Macleod Co. ..... Cincinnati
Paul Maehler Co. ..... Chicago
Magnaflux Corp. ..... Chicago
R. C. Mahon Co. ..... Detroit
Mahr Mfg. Co., Div. Diamond Iron Works, Inc. .. Minneapolis
Mall Tool Co. ..... Chicago
Marathon Chemical Co., Div Marathon Paper Mills Co. ..... Rothschild, Wis.
Master Tool Co., Inc. ..... Cleveland
Mathews Conveyer Co. ..... Ellwood City, Pa.
Metallizing Co. of America ..... Chicago
Michigan Smelting & Refining Div., Bohn Aluminum & Brass Corp. ..... Detroit
Mid-West Abrasive Co. ..... Detroit
Milwaukee Foundry Equipment Co. ..... Milwaukee
Mine Safety Appliances Co. ..... Pittsburgh, Pa.
Modern Equipment Co. ..... Port Washington, Wis.
Molybdenum Corp. of America ..... Pittsburgh, Pa.
Jas. A. Murphy & Co. ..... Hamilton, Ohio

Nassau Smelting & Refining Co., Inc. ..... New York
National Carbon Co., Inc., Carbon Products Div. .. New York
National Engineering Co. ..... Chicago
National Gypsum Co. ..... Buffalo
Newaygo Engineering Co. ..... Newaygo, Mich.
New Jersey Silica Sand Co. ..... Millville, N. J.
Niagara Falls Smelting & Refining Corp. ..... Buffalo
Niagara Blower Co. ..... New York
Wm. H. Nicholls Co., Inc. ..... Richmond Hill, N. Y.
Nichols Engineering & Research Corp. ..... New York
North American Smelting Co. ..... Philadelphia

S. Obermayer Co. ..... Chicago
Oliver Machinery Co. ..... Grand Rapids, Mich.
Osborn Mfg. Co. ..... Cleveland

Pangborn Corp. ..... Hagerstown, Md.
Parsons Engineering Corp. ..... Cleveland
Peerless Mineral Products Co. ..... Conneaut, Ohio
Penn-Rillton Co. ..... New York
Pennsylvania Foundry Supply & Sand Co. ..... Philadelphia
Penola, Inc. ..... Pittsburgh, Pa.
Peters-Dalton, Inc. ..... Detroit
Geo. F. Pettinos, Inc. ..... Philadelphia
Picker X-Ray Corp. ..... New York
E. W. Pike & Co. ..... Elizabeth, N. J.
Pittsburgh Crushed Steel Co. ..... Pittsburgh, Pa.
Pittsburgh Lectromelt Furnace Corp. ..... Pittsburgh, Pa.
Porter-Cable Machine Co. ..... Syracuse, N. Y.
Powermatic Ventilator Co. ..... Cleveland
Pyro Clay Products Co. ..... Oak Hill, Ohio
Pyrometer Instrument Co. ..... New York

Queen City Sand & Supply Co. ..... Buffalo

Radium Chemical Co., Inc. ..... New York
Ramtite Co., Div. S. Obermayer Co. ..... Chicago
N. Ransohoff, Inc. ..... Cincinnati
Reinhold Publishing Corp. ..... New York
Reliable Pattern & Castings Co. ..... Cincinnati
Reliance Lead-Solder & Babbitt Co. ..... Buffalo, N. Y.
Republic Coal & Coke Co. ..... Chicago
Republic Structural Iron Works ..... Cleveland
Robins Conveyors Inc. ..... Passaic, N. J.
Rochester Smelting & Refining Co. ..... Rochester, N. Y.
Rotor Tool Co. ..... Cleveland
Royer Foundry & Machine Co. ..... Kingston, Pa.

Safety Engineering ..... New York
Sand Products Corp. ..... Detroit
Claude B. Schneible Co. ..... Detroit
A. Schrader's Son ..... Brooklyn, N. Y.
Schramm, Inc. ..... West Chester, Pa.
F. E. Schundler & Co., Inc. ..... Joliet, Ill.
Scientific Cast Products Corp. ..... Cleveland
Semet Solvay Co. ..... New York
Severance Tool Industries Inc. ..... Saginaw, Mich.
Simplicity Engineering Co. ..... Durand, Mich.
W. W. Sly Mfg. Co. ..... Cleveland
Smith Facing & Supply Co. ..... Cleveland
Smith Oil & Refining Co. ..... Rockford, Ill.
Werner G. Smith Co., Div. Archer-Daniels-Midland Co. ..... Cleveland
Spencer Turbine Co. ..... Hartford, Conn.
SPO, Inc. ..... Cleveland
Springfield Facing Co. ..... Springfield, Mass.
Standard Conveyor Co. ..... North St. Paul, Minn.
Standard Horse Nail Corp. ..... New Brighton, Pa.
Standard Sand & Machine Co. ..... Chicago
Steel Conversion & Supply Co. ..... Pittsburgh, Pa.
Steel Shot and Grit Co. ..... Boston, Mass.
Steelblast Abrasives Co. ..... Cleveland
Sterling Wheelbarrow Co. ..... Milwaukee
Frederic B. Stevens, Inc. ..... Detroit
Stroman Furnace & Engineering Co. ..... Chicago
Swan-Finch Oil Corp. ..... New York
Syntron Co. ..... Homer City, Pa.

Tabor Mfg. Co. ..... Philadelphia
Taggart & Co. ..... Philadelphia
Tamms Silica Co. ..... Chicago
Thomas Truck & Caster Co. ..... Keokuk, Iowa
Tiona Petroleum Co. ..... Philadelphia
Titanium Alloy Mfg. Co. ..... Niagara Falls, N. Y.
Toledo Scale Co. ..... Toledo, Ohio
Tonawanda Iron Corp. ..... No. Tonawanda, N. Y.
Treat Nantke Co., Inc. ..... No. Tonawanda, N. Y.
Tubular Micrometer Co. ..... St. James, Minn.

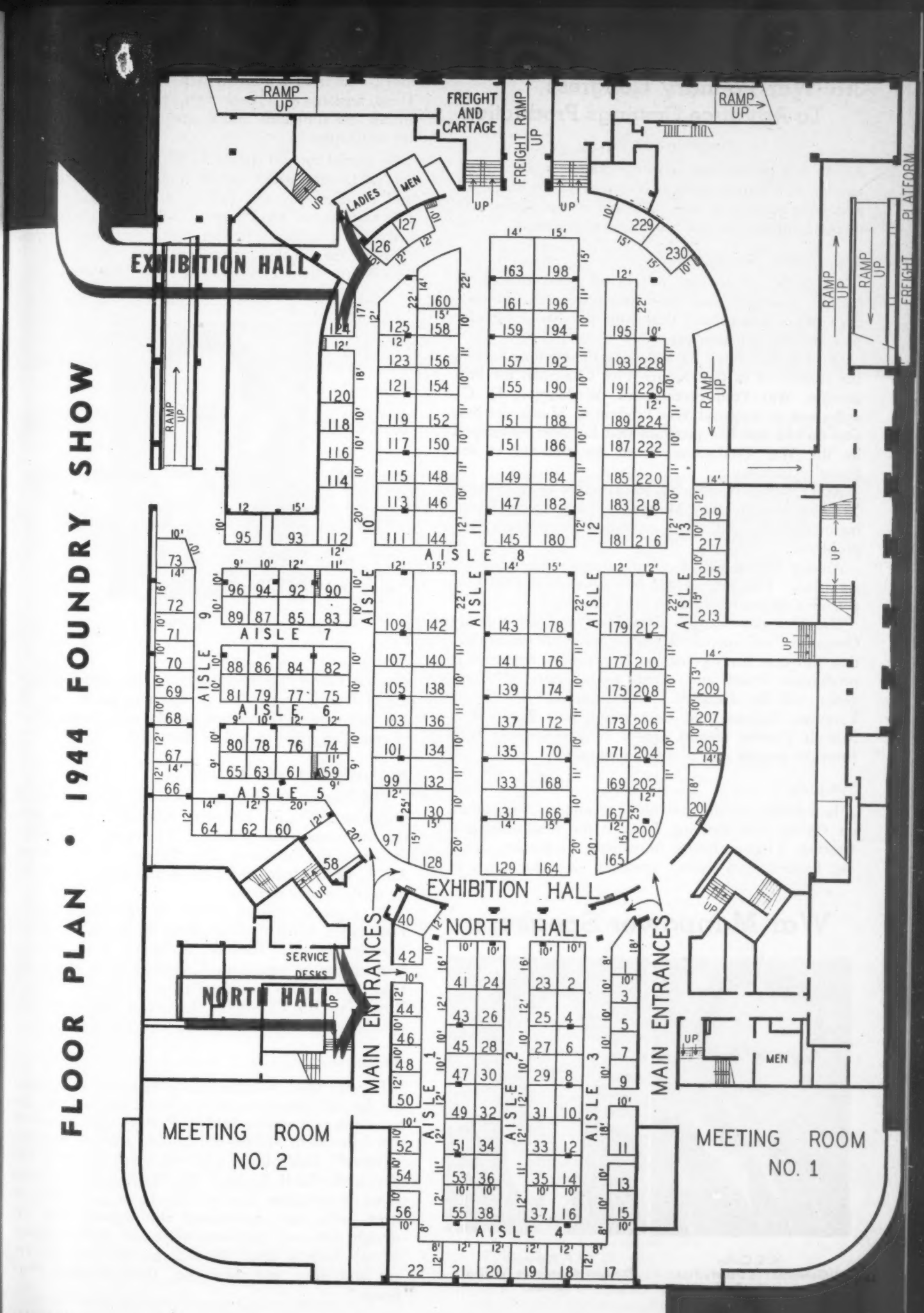
United Compound Co., Inc. ..... Buffalo
United Oil Mfg. Co. ..... Erie, Pa.
United States Graphite Co. ..... Saginaw, Mich.
United States Gypsum Co. ..... Chicago
United States Hoffman Machinery Corp. ..... New York
U. S. Reduction Co. ..... East Chicago, Ind.
University of Rochester ..... Rochester, N. Y.

Vanadium Corp. of America ..... New York
Vesuvius Crucible Co. ..... Swissvale, Pittsburgh, Pa.

Wadsworth Core Machine & Equipment Co. ..... Akron, Ohio
Western Metal Co. ..... Chicago
Wheelco Instruments Co. ..... Chicago
Whitehead Brothers Co. ..... New York
Whiting Corp. ..... Harvey, Ill.
Willson Products, Inc. ..... Reading, Pa.
E. J. Woodison Co. ..... Detroit
Worthington Pump & Machinery Corp. ..... Harrison, N. J.

Yale & Towne Mfg. Co. ..... Philadelphia
Young Brothers Co. ..... Detroit

Zanesville Sand Co. ..... Zanesville, Ohio


FLOOR PLAN • 1944 FOUNDRY SHOW
RAMP UP
FREIGHT AND CARTAGE
FREIGHT RAMP UP
LADIES
MEN
EXHIBITION HALL
FREIGHT PLATFORM
AISLE 1
AISLE 2
AISLE 3
AISLE 4
AISLE 5
AISLE 6
AISLE 7
AISLE 8
AISLE 9
NORTH HALL
SERVICE DESKS
MAIN ENTRANCES
MEETING ROOM NO. 1
MEETING ROOM NO. 2

3rd War Foundry Congress To Advance Castings Production

(Concluded from page 4)

papers will be devoted to spectrographic analysis, and another to a combined method of analysis for unalloyed and alloyed iron and steel. Another special session will discuss solidification and heat transfer problems.

Management Interest Sessions

A number of sessions will be of great interest to foundry managers and those responsible for cost control. Two sessions will deal with the No. 1 foundry problem today, manpower.

On Tuesday, April 25, following the opening session, the consultant to the Deputy Vice Chairman for Production, War Production Board, Washington, D. C., will speak to a special War Production Manpower Session on the selective program that has been developed by the War Production Board for the aid of the Foundry Industry.

At 11:00 on Wednesday, the Director of Apprentice Training Service, War Manpower Commission, Washington, D. C., will speak on post-war apprenticeship problems.

Among the subjects of great current interest is renegotiation. This subject will be discussed on Friday at a session sponsored by the Cost Committee.

On Thursday the Job Evaluation and Time Study Committee will sponsor a session at which job evaluation and time study principles as approved by the War production board and standards in times of emergency will be discussed. Those sessions devoted to Foreman Training and Cooperation with Engineering Schools likewise should appeal to management both from the present and post-war viewpoint.

Symposia

In addition to the previously mentioned Symposium on Gating and Risering Practice for Malleable Iron Castings, a lecture course, in reality a symposium, covering heading and gating practices for other types of alloys, will hold a session each day of the Congress. These sessions will cover steel, gray iron, brass and bronze and aluminum and magnesium gating and risering techniques.

Of special interest should be the Symposium on Centrifugal Casting which will be composed of two sessions held on Thursday and Friday of the Congress Week. The first session, on Thursday, will be, in general, devoted to centrifugal casting problems of non-ferrous alloys. One of the papers will deal with the much heralded investment molding process. The second session, on Friday, will be devoted to the centrifugal casting of ferrous materials. In the Symposium, not only will techniques be described, but the engineering aspects of centrifugal casting will be discussed.

"Colonel" Jack Major

Business and Awards Meeting

The Annual Business and Awards Meeting will be staged at 9:30 a.m., Thursday, April 27. At this meeting the membership will hear the report of its officers and also the results of the election of new officers. A.F.A. Gold Medal and Life Membership Awards will be made at this meeting.

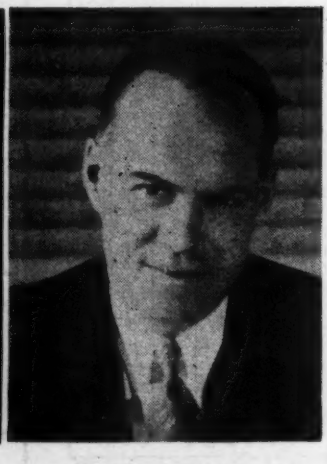
Of especial interest should be the second A.F.A. Foundation Lecture to be presented by H. W. Gillett, Battelle Memorial Institute, Columbus, Ohio, who has been chosen by your Lecture Committee to present this talk. Mr. Gillett has chosen for his subject "Cupola Raw Materials," a subject of extreme interest to many members of the Association.

Annual Dinner

In accordance with the policy begun last year, staging the Annual Dinner on the last day of the Congress, that event this year will be held on Friday, April 28, at 7:00 p.m. President Wilson will preside and will introduce "Colonel" Jack Major, who will speak on "With Our Boys in the South Pacific." Mr. Major has just returned from an extensive tour of that battle area where he lived with and entertained our fighting sons. His straight talk and humorous quips both hold a message all will wish to hear. He explains how our boys live, eat and sleep and what they think of those "back home."

War Manpower Speakers

H. S. Colby
Consultant to Deputy Vice-Chairman for Production, W.P.B.



W. F. Patterson
Director Apprentice Training Service

HOSTS to the 3rd War Production CONGRESS

Frank E. Bates,
Chairman, Western New York Chapter, and General Chairman, Buffalo Congress Committee

Local Committees Prepare for Action

General Committee*

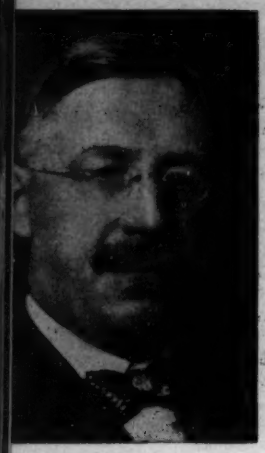
Honorary Chairman—H. D. Miles, Buffalo Foundry & Machine Co., A.F.A. Past President.
Honorary Chairman—N. K. B. Patch, Lumen Bearing Co., A.F.A. Past President.
General Chairman—F. E. Bates, Worthington Pump & Machinery Corp.
General Vice Chairman—R. D. Loesch, Lake Erie Foundry Co.
Treasurer—M. W. Pohlman, Pohlman Foundry Co., Inc.
Secretary—J. R. Turner, Queen City Sand & Supply Co.
C. O. Burgess, Union Carbide & Carbon Research Laboratories, Inc., Niagara Falls.
T. H. Burke, Otis Elevator Co.
A. A. Diebold, Atlas Steel Casting Co.
M. T. Ganzauge, General Railway Signal Co., Rochester.
R. K. Glass, Republic Steel Corp.
E. R. Jones, Lumen Bearing Co.
E. E. LeViness, Combined Supply & Equipment Co., Inc.
J. C. McCallum, McCallum-Hatch Bronze Co., Inc.
R. T. Melville, Hanna Furnace Corp.
M. J. O'Brien, Symington-Gould Corp., Depew.
R. T. Rycroft, Jewell Alloy & Malleable Co., Inc.
H. F. Sproull, A. P. Green Firebrick Co.
Lt. (jg) J. R. Wark, United States Navy.
J. L. Yates, Worthington Pump & Machinery Corp.

*Unless otherwise designated, company location is Buffalo, N. Y.

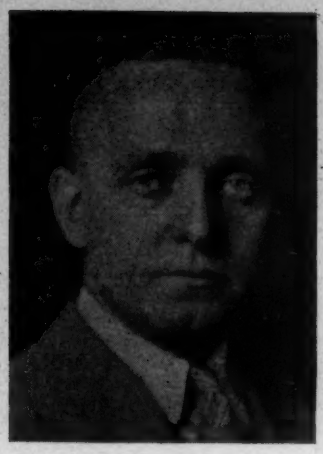
★

Arrangements Committee

Chairman—H. C. Winte, Worthington Pump & Machinery Corp.
Vice Chairman—R. W. Bishop, Electro Metallurgical Co., Niagara Falls.
J. D. Amoroso, Sterling Engine Co.
J. P. Begley, Pratt & Letchworth Co.
C. O. Burgess, Union Carbide & Carbon Research Laboratories, Inc., Niagara Falls.
T. H. Burke, Otis Elevator Co.
L. E. Collins, Medina Stamping & Machine Co., Medi
L. F. Dalton, Symington-Gould Corp., Rochester.
H. G. Ekdahl, Economy Pattern Works.



N. K. B. Patch,
Past President, A.F.A.
Honorary Chairman



M. W. Pohlman,
Chapter Treasurer
Treasurer, Solicitation Committee

R. T. Rycroft,
Chapter Director
Chairman, Preview Day Committee

C. O. Burgess,
Chapter Director
Vice-Chairman, Preview Day Committee

A. A. Diebold,
Chapter Director

Arrangements Committee (Cont'd)

C. W. Fabel, Curtiss-Wright Corp.
J. W. Forsey, General Motors Corp. (Harrison Radiator Div.), Lockport.
R. K. Glass, Republic Steel Corp.
J. C. Goetz, Acme Steel & Malleable Iron Works, Inc.
W. L. Harbrecht, Electro Metallurgical Co., Niagara Falls.
F. G. Hendler, Aero Pattern Works.
W. D. Hunsicker, Worthington Pump & Machinery Corp.
H. R. King, Metal & Alloys Specialties Co., Inc.
W. D. Mathers, American Magnesium Corp.
V. M. Mazurie, Buffalo Foundry & Machine Co.
J. C. McCallum, McCallum-Hatch Bronze Co., Inc.
F. T. McQuillin, Standard Buffalo Foundry, Inc.
W. S. Miller, Chas. C. Kawin Co.
J. Nixon, Whitehead Metal Products Co., Inc., of New York.
E. A. Piper, Pohlman Foundry Co., Inc.
A. Rankin, Lake Erie Engineering Corp., Kenmore.
G. B. Ross, Republic Steel Corp.
E. J. Sierk, General Motors Corp. (Harrison Radiator Div.), Lockport.
A. H. Suckow, Symington-Gould Corp., Rochester.
L. C. Thellemann, Inter-Allied Foundries of New York State.
W. J. Venus, Jewell Alloy & Malleable Co., Inc.
A. Westons, Clark Brothers Co., Olean.

★

Solicitation Committee

Chairman—V. L. Whitehead, Jr., Whitehead Bros. Co.
Vice Chairman—J. C. McCallum, McCallum-Hatch Bronze Co., Inc.
Treasurer—M. W. Pohlman, Pohlman Foundry Co., Inc.
Secretary—J. R. Turner, Queen City Sand & Supply Co.

Lower Left—
J. C. McCallum,
Vice-Chairman, Solicitation Committee

Below
Mrs. R. T. Rycroft,
Sec'y-Treas., Ladies' Committee

Lower Right—
H. C. Winte,
Chairman, Arrangements Committee

Below
H. J. Struebling,
Vice-Chairman, Hotel and Housing Committee

E. R. Jones,
Chapter Director
Vice-Chairman, Special Events Committee

H. F. Sproull,
Chapter Director
Chairman, Special Events Committee

M. J. O'Brien,
Chapter Director
Chairman, Transportation Committee

J. L. Yates,
Chapter Director
Vice-Chairman, Dinner Committee

H. D. Miles,
Past President, A.F.A.
Honorary Chairman

T. H. Burke,
Chairman, Reception Committee

Solocitation Committee (Cont'd)

C. P. Clark, Clark Brothers Co., Olean.
A. F. Crone, Acme Steel & Malleable Iron Works, Inc.
G. S. Diamond, Electro Refractories & Alloys Corp.
A. A. Diebold, Atlas Steel Castings Co.
R. K. Glass, Republic Steel Corp.
T. S. Hemenway, Metal & Alloy Specialties Co., Inc.
A. W. Murray, Bison Castings, Inc.
J. L. Yates, Worthington Pump & Machinery Corp.

★

Hotel and Housing Committee

Chairman—A. J. Heysel, E. J. Woodison Co.
Vice-Chairman — H. J. Struebling, Electro Refractories & Alloys Corp.
E. W. Duetschlander, Worthington Pump & Machinery Corp.
W. S. Miller, Chas. C. Kawin Co.

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Special Events

Chairman—H. F. Sproull, A. P. Green Firebrick Co.
Vice-Chairman—E. R. Jones, Lumen Bearing Co.
P. J. Buchheit, Electro Refractories & Alloys Corp.
W. H. Taylor, Worthington Pump & Refractories Corp.
A. Westons, Clark Brothers Co., Olean.

★

Transportation Committee

Chairman—H. J. O'Brien, Symington-Gould Corp., Depew.
Vice-Chairman—R. T. Melville, Hanna Furnace Corp.
Secretary—E. E. LeViness, Combined Supply & Equipment Co., Inc.

L. A. Merryman,
General Chairman, Ladies' Committee

G. B. Michie,
Chairman, Dinner Committee

Lower Left—
V. L. Whitehead,
Chairman, Solicitation Committee

Below
Mrs. R. P. Loesch,
Vice-Chairman, Ladies' Committee

Lower Right—
M. S. Finley,
Vice-Chairman, Reception Committee

Below
R. W. Bishop,
Vice-Chairman, Arrangements Committee

A. H. Suckow
Vice-Chairman, Publicity Committee

Mrs. R. J. Turner,
Chairman, Ladies' Committee

H. K. Rose,
Secretary, Publicity Committee

L. C. Thellemann,
Chairman, Publicity Committee

A. J. Heysel,
Chairman, Hotel and Housing Committee

Buffalo Preview Day Committee

Chairman—R. T. Rycroft, Jewell Alloy & Malleable Co., Inc.
Vice Chairman—C. O. Burgess, Union Carbide & Carbon Research Laboratories, Inc., Niagara Falls.

S. Appelby, Buffalo Foundry & Machine Co.
R. B. Benz, Buffalo Niagara Electric Corp.
R. Fava, Sargent & Greenleaf, Inc., Rochester.
R. K. Glass, Republic Steel Corp.
J. C. Goetz, Acme Steel & Malleable Iron Works, Inc.
W. L. Harbrecht, Electro Metallurgical Co., Niagara Falls.
E. H. Holzworth, Frontier Bronze Corp., Niagara Falls.
W. D. Hunsicker, Worthington Pump & Machinery Corp.
H. R. King, Metal & Alloy Specialties Co., Inc.
G. F. Loud, General Motors Corp. (Harrison Radiator Div.), Lockport.
W. S. Miller, Chas. C. Kawin Co.
T. M. O'Brien, Clark Brothers Co., Olean.
E. A. Piper, Pohlman Foundry Co., Inc.
J. H. Sander, American Radiator & Standard Sanitary Corp.
A. H. Suckow, Symington-Gould Corp., Rochester.
L. C. Thellemann, Inter-Allied Foundries of New York State.

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Reception Committee

Chairman—T. H. Burke, Otis Elevator Co.
Vice Chairman—M. S. Finley, Werner G. Smith Co.

A. R. Amann, Acme Steel & Malleable Iron Works, Inc.
E. I. Anderson, Westinghouse Electric & Mfg. Co., Attica.
H. L. Anderson, American Crucible Co., Kenmore.
R. L. Baldwin, National Carbon Co., Inc., Niagara Falls.
L. W. Barger, Symington-Gould Corp., Depew.
T. L. Bauer, Tanner Mfg. Co., Erie, Pa.
J. B. Begley, Pratt & Letchworth Co.
R. B. Benz, Buffalo Niagara Electric Corp.
A. H. Bond, W. W. Sly Mfg. Co.
W. G. Brayer, Bausch & Lomb Optical Co., Rochester.
J. C. Buehlmann, Symington-Gould Corp., Depew.
C. P. Clark, Clark Brothers Co., Olean.
R. L. Cleland, Eastern City Products Corp.
Neal F. Clement, Rochester-Erie Foundry Co., Rochester.
W. M. Collins, Symington-Gould Corp., Rochester.
G. F. Comstock, Titanium Alloy Mfg. Co., Niagara Falls.
G. G. Crewson, Whiting Corp.
A. F. Crone, Acme Steel & Malleable Iron Works, Inc.
L. A. Crone, Acme Steel & Malleable Iron Works, Inc., New York.
C. J. Cusack, Republic Steel Corp.
C. H. DeLamater, American Magnesium Corp.
M. L. Doelman, National Engineering Co.
J. P. Dunphy, Symington-Gould Corp., Rochester.
C. L. Epperson, Symington-Gould Corp., Rochester.
R. H. Evans, Bovaird & Seyfang Mfg. Co., Bradford, Pa.
C. W. Fabel, Curtiss-Wright Corp.
R. Fava, Sargent & Greenleaf, Inc., Rochester.
C. Fenevessey, Mellaphone Corp., Rochester.
E. L. Fisher, Dunkirk Foundries, Inc., Dunkirk.
E. J. Gates, Atlas Steel Casting Co.
H. B. Gates, Kindt Collins Co., Williamsport, Pa.
L. F. Geary, Clark Brothers Co., Olean.
M. F. Gentner, Sargent & Greenleaf, Inc., Rochester.
R. K. Glass, Republic Steel Corp.
L. C. Gleason, Gleason Works, Rochester.
D. F. Hagberg, Ingersoll-Rand Co.
B. T. Hain, American Radiator & Standard Sanitary Corp.
H. B. Hanley, American Laundry Machinery Co., Rochester.
R. Y. Hanson, Massey Harris Co., Inc., Batavia.
L. S. Harwood, General Motors Corp. (Harrison Radiator Div.), Lockport.
H. Hecht, Alloys & Products, Inc., Rochester.
G. F. Hodgson, Doehler Die Casting Co., Batavia.
E. H. Holzworth, Frontier Bronze Corp., Niagara Falls.
E. G. Jarvis, Niagara Falls Smelting & Refining Corp.
J. G. Jenkins, United States Graphite Co., Saginaw, Mich.
J. Kaufer, Tanner Mfg. Co., Erie, Pa.
I. J. Kaufmann, Rochester Smelting & Refining Co., Rochester.
L. F. Leney, United Compound Co.
S. LeViness, Jr., Combined Supply & Equipment Co.
S. A. LeViness, Combined Supply & Equipment Co.
D. Levinson, Acme Steel & Malleable Iron Works, Inc.
H. J. Livingston, Precision Grinding Wheel Co., Philadelphia.
E. H. Maeder, Weil-McLain Co., Erie, Pa.
R. J. Maddison, Whitehead Bros. Co., Rochester.
J. E. Maher, Jamestown Iron Works Co., Jamestown.
W. D. Mathers, American Magnesium Corp.
J. E. McHenry, Gleason Works, Rochester.
A. McKaig, Michigan Metal Abrasive Co., Jackson, Mich.
C. S. McMath, E. J. Woodison Co.
F. T. McQuillin, Standard Buffalo Foundry, Inc.
C. J. Menzemer, Frederic B. Stevens, Inc.
L. A. Merryman, Tonawanda Iron Corp., North Tonawanda.
N. G. Mibaum, The Anstice Co., Inc., Rochester.
L. J. Moriarity, Dunkirk Foundries, Inc., Dunkirk.
J. A. Morrissey, Industrial Silica Corp.
W. F. Morton, The Anstice Co., Inc., Rochester.
D. P. Murphy, Symington-Gould Corp., Depew.
J. H. Neal, United States Army.
T. M. O'Brien, Clark Brothers Co., Olean.
T. W. O'Hara, Symington-Gould Corp., Depew.
R. Pattison, Pratt & Letchworth Co.
H. O. Pels, General Motors Corp. (Harrison Radiator Div.), Lockport.
P. A. Pratt, Symington-Gould Corp., Rochester.
A. F. Preuster, International Graphite & Electrode Co., Niagara Falls.
R. Putnam, Symington-Gould Corp., Rochester.

A. Rankin, Lake Erie Engineering Corp., Kenmore.
J. I. Reid, Symington-Gould Corp., Rochester.
G. B. Ross, Republic Steel Corp.
W. H. Rother, Buffalo Foundry & Machine Co.
J. H. Sander, American Radiator & Standard Sanitary Corp.
J. A. Saver, Symington-Gould Corp., New York.
A. E. Schobeck, Jamestown Malleable Iron Corp., Jamestown.
D. M. Scott, Allegheny Ludlum Steel Corp.
J. A. Shaw, International Graphite & Electrode Co., Niagara Falls.
R. Sheffield, Bovaird & Seyfang Mfg. Co., Bradford, Pa.
E. J. Sierk, General Motors Corp. (Harrison Radiator Div.), Lockport.
A. E. Smith, National Engineering Co.
N. Stanley Snyder, Link Belt Co., Chicago.
D. R. Steele, Progressive Foundry Works, Rochester.
H. G. Swan, Symington-Gould Corp., Depew.
T. Teeters, Electro Refractories & Alloys Corp.
W. J. Venus, Jewell Alloy & Malleable Co., Inc.
A. W. Van Vleck, Whitehead Brothers Co., Royal Oak, Mich.
R. A. Wade, Pratt & Letchworth Co.
R. E. Walther, Whiting Corp.
J. R. Wark, Jr., United States Navy.
W. C. Weaver, Symington-Gould Corp., Depew.
R. T. Wedgewood, Pickands, Mather & Co., Erie, Pa.
B. R. Weidle, Lancaster Malleable & Steel Corp., Lancaster.
L. H. Wells, Clearfield Machine Co., Rochester.
H. W. Wendt, Jr., Buffalo Forge Co.
A. Westons, Clark Brothers Co., Olean.
K. Williams, Pratt & Letchworth Co.
J. Willsea, Willsea Works, Inc., Rochester.
A. F. Wolf, Simonds Saw & Steel Co., Lockport.
D. H. Wray, Henry Wray & Son, Inc., Rochester.

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Ladies Committee

General Chairman—L. A. Merryman, Tonawanda Iron Corp., North Tonawanda.
Chairman—Mrs. J. R. Turner.
Vice-Chairman—Mrs. R. D. Loesch.
Secretary-Treasurer—Mrs. R. T. Rycroft.

Mrs. F. E. Bates
Mrs. J. P. Begley
Mrs. R. B. Benz
Mrs. P. J. Buchheit
Mrs. C. O. Burgess
Mrs. T. H. Burke
Mrs. L. E. Collins
Mrs. G. S. Diamond
Mrs. A. A. Diebold
Mrs. M. L. Doelman
Mrs. M. S. Finley
Mrs. M. T. Ganzauge
Mrs. W. J. Gibney
Mrs. R. K. Glass
Mrs. H. B. Hanley
Mrs. T. S. Hemenway
Mrs. A. J. Heysel
Mrs. J. G. Jenkins
Mrs. E. R. Jones
Mrs. E. E. LeViness
Mrs. J. C. McCallum
Mrs. F. T. McQuillin
Mrs. L. A. Merryman
Mrs. G. B. Michie
Mrs. W. S. Miller
Mrs. R. W. Molley
Mrs. A. J. Morgan
Mrs. D. P. Murphy
Mrs. A. W. Murray
Mrs. M. J. O'Brien
Mrs. M. W. Pohlman
Mrs. H. K. Rose
Mrs. H. F. Sproull
Mrs. H. J. Struebling
Mrs. A. H. Suckow
Mrs. L. C. Thellemann
Mrs. J. R. Wark
Mrs. B. R. Weidle
Mrs. V. L. Whitehead, Jr.
Mrs. K. Williams
Mrs. H. C. Winte
Mrs. J. L. Yates

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Publicity Committee

Chairman—L. C. Thellemann, Inter-Allied Foundries of New York State.
Vice-Chairman — A. H. Suckow, Symington-Gould Corp., Rochester.
Secretary—H. K. Rose, Swan, Finch Oil Co.
A. R. Amann, Acme Steel & Malleable Iron Works, Inc.
S. Appelby, Buffalo Foundry & Machine Co.
R. B. Benz, Buffalo Niagara Electric Co.
A. E. Bickell, General Refractories Corp.
P. J. Buchheit, Electro Refractories & Alloys Corp.
A. A. Diebold, Atlas Steel Casting Co.
H. R. King, Metal & Alloy Specialties Co., Inc.
H. B. Klar, Osborn Mfg. Co., Kenmore.
R. D. Loesch, Lake Erie Foundry Co.
J. J. Mayer, Lumen Bearing Co.
F. T. McQuillin, Standard Buffalo Foundry, Inc.
R. W. Molley, Foundry Metal Sales.
J. C. Nagy, Chas. C. Kawin Co.
J. Nixon, Whitehead Metal Products Co., Inc., of New York.
A. M. Petz, Symington-Gould Corp., Depew.
J. E. Sharp, Scott Aviation Corp., Lancaster.
W. J. Venus, Jewell Alloy & Malleable Co., Inc.
B. R. Weidle, Lancaster Malleable & Steel Corp., Lancaster.

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Dinner Committee

Chairman—Geo. B. Michie, Electro Refractories & Alloys Corp.
Vice-Chairman—J. L. Yates, Worthington Pump & Machinery Corp.
A. R. Amann, Acme Steel & Malleable Iron Works, Inc.
J. D. Amoroso, Sterling Engine Co.
E. I. Anderson, Westinghouse Electric & Mfg. Co., Attica.
H. L. Anderson, American Crucible Co., Kenmore.
S. Appelby, Buffalo Foundry & Machine Co.
R. H. Baker, General Railway Signal Co., Churchville.
R. L. Baldwin, National Carbon Co. (Electrode Div.), Niagara Falls.
L. W. Barger, Symington-Gould Corp., Depew.
T. L. Bauer, Tanner Mfg. Co., Erie, Pa.
J. P. Begley, Pratt & Letchworth Co.
R. B. Benz, Buffalo Niagara Electric Corp.
A. H. Bond, W. W. Sly Mfg. Co., Rochester.
A. Boyd, Worthington Pump & Machinery Corp.
W. G. Brayer, Bausch & Lomb Optical Co., Rochester.
P. J. Buchheit, Electro Refractories & Alloys Corp.
J. C. Buehlmann, Symington-Gould Corp., Depew.
R. L. Cleland, Eastern Clay Products Co.
N. F. Clement, Rochester-Erie Foundry Corp., Rochester.
L. E. Collins, Medina Stamping & Machine Co., Inc., Medina.
W. M. Collins, Symington-Gould Corp., Rochester.
G. F. Comstock, Titanium Alloy Mfg. Co., Niagara Falls.
M. J. Connolly, Pratt & Letchworth Co.
J. W. Considine, Jewell Alloy & Malleable Co.
A. F. Crone, Acme Steel & Malleable Iron Works, Inc.
L. A. Crone, Acme Steel & Malleable Iron Works, Inc., New York.
C. J. Cusack, Republic Steel Corp.
L. F. Dalton, Symington-Gould Corp., Rochester.
C. H. DeLamater, American Magnesium Corp.
E. W. Deutschlander, Worthington Pump & Machinery Corp.
G. S. Diamond, Electro Refractories & Alloys Corp.
M. L. Doelman, National Engineering Co.
J. T. Domanski, Worthington Pump & Machinery Corp.
J. P. Dunphy, Symington-Gould Corp., Rochester.
H. G. Ekdahl, Economy Pattern Works.
C. L. Epperson, Symington-Gould Corp., Rochester.
C. W. Fabel, Curtiss-Wright Corp.
R. Fava, Sargent & Greenleaf, Inc., Rochester.
C. Fenevessey, Mellaphone Corp., Rochester.
M. Finley.
J. W. Forsey, General Motors Corp. (Harrison Radiator Div.), Lockport.
L. F. Gadbois, W. H. Miner, Inc.
E. J. Gates, Atlas Steel Casting Co.
H. B. Gates, Kindt Collins Co., Williamsport, Pa.
L. F. Geary, Clark Bros. Div., Dresser Mfg. Co., Olean.
M. F. Gentner, Sargent & Greenleaf, Inc., Rochester.
R. K. Glass, Republic Steel Corp.
J. C. Goetz, Acme Steel & Malleable Iron Works, Inc.
D. F. Hagberg, Ingersoll-Rand Co.

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OFFICERS and DIRECTORS

L. C. Wilson,
President and Nominee for Director

Ralph J. Teeter,
Vice-President and Nominee for President

Fred J. Walls,
Nominee for Vice-President

L. C. Wilson

L. C. WILSON, general manager, Reading Steel Casting Div., American Chain & Cable Co., Inc., Reading, Pa., who is now serving as President of A.F.A., has been nominated for a three-year term as a director. During President Wilson's term, the Association has prospered, attaining its greatest membership and increasing its service to the industry. His nomination as a director assures the Association of his wise counsel for another three-year period. Having served also as vice-president and director (1926-28) prior to his assumption of the presidency, his experience in Association affairs will be of great value to his successors.

President Wilson also has been active in the technical activities of A.F.A., serving for many years as a member of the Steel Division Advisory Committee, and as chairman of the Division's Committee on Impact Testing. He has served as chairman of convention sessions and in many ways has been active in association work. His interest in testing methods has caused him to be appointed as A.F.A. representative on the A.S.T.M. Committee E-1 on Methods of Testing.

Mr. Wilson secured his preparatory education in the schools of New Haven, Conn., and his technical training in the Sheffield Scientific School of Yale University, being graduated from this school in 1907.

On completing his work at Yale, Mr. Wilson entered the sales department of the Harbison-Walker Refractories Co., representing this company over a period of years in its Pittsburgh, Chicago, New York and New England districts. Later, he joined the staff of the Chain Belt Co., Milwaukee, as assistant to the vice-president, later being made general sales manager. Transferring to the Federal Malleable Co., Milwaukee, as secretary, Mr. Wilson was later elected vice-president and general manager, which position he relinquished when he accepted his present affiliation with the Reading Steel Casting Div., American Chain & Cable Co.

Ralph J. Teetor

RALPH J. TEETOR, who has been nominated as President of the American Foundrymen's Association, of which he now is serving as Vice-President, is president, Cadillac Malleable Iron Co., Cadillac, Mich. His sustained activity in the work of the Association well qualifies him for the presidency. Mr. Teetor has been active in the affairs of the Malleable Iron Division Advisory and other committees. He has presented several papers before annual conventions and in other ways has participated in the work of the Association. Mr. Teetor served as a director of American Foundrymen's Association from 1933-1935. He also has served as a director of the Western Michigan Chapter.

Mr. Teetor comes from a family whose interests have been in the foundry industry. His higher education was obtained at Purdue University, Lafayette, Ind., from which he was graduated in 1905 with a degree in mechanical engineering. Following his graduation, he became associated with the Link Belt Co., Indianapolis, where he rose to the position of chief engineer. He resigned that position in 1915 to become secretary of the Standard Malleable Iron Co., Muskegon, Mich.

During the last World War, he served as major of infantry until December, 1918, and as division inspector until 1919 when he was discharged from the Army. He then became vice-president and general manager, Howe Chain Co., Muskegon, Mich., remaining there until 1921 when he became interested in the iron and lumber business in Cadillac, Mich. His interests in that locality led him to establish the Cadillac Malleable Iron Co. where he became secretary and general manager, taking an active interest in

the erection and operation of the plant. Later, he was elected to the presidency of this company, a position he now holds.

R. T. Rycroft

R. T. RYCROFT, who has been nominated for a three-year directorship of your Association, is President, Jewell Alloy & Malleable Co., Inc., Buffalo, N. Y. Mr. Rycroft is a Past Chairman of the Western New York Chapter of A.F.A. and has been interested in the affairs of the Association for a number of years. He was one of the organizers of the Western New York Chapter, and is now serving on its Board of Directors.

F. J. Walls

FRED J. WALLS, International Nickel Co., New York, Manager, Detroit office, Development and Research Division, has been nominated as Vice-President of your Association. He is well known by the membership and in the foundry industry for his long and excellent service in the various activities of the Association. He served on the Board of Directors for three years, 1939-1942, and as a member or chairman of numerous committees of the Gray Iron Division, of which he is now serving as General Chairman.

Frank J. Dost,
Nominee for Director

In 1930, he presented the annual exchange paper of A.F.A. to the Institute of British Foundrymen.

Mr. Walls was born in Oakland County, Mich., and received his technical education at the University of Michigan, where he specialized in metallurgy. On leaving school, he entered the employ of Packard Motor Car Co., Detroit, and later was associated with the Wilson Foundry & Machine Co., Pontiac, Mich., where he rose to the position of chief metallurgist in 1923. In 1932, he was consultant to Eaton-Erb Foundry Co., Vassar, Mich., now foundry division, Eaton Mfg. Co., and acted as manager prior to assuming his present position with International Nickel Company, late in 1934.

In 1933-1934 he was President of the Detroit Foundrymen's Association, before it became a chapter of A.F.A., and served as a Director when it became the Detroit Chapter. Mr. Walls is a member of, and active on, committees of the Society of Automotive Engineers, American Society for Metals, American Society for Testing Materials, and the Engineering Society of Detroit.

Frank J. Dost

FRANK J. DOST, who has been nominated for a three-year directorship of your Association, is vice-president and secretary, Sterling Foundry Co., Wellington, Ohio. Mr. Dost brings to the Board of Directors a knowledge of many of the activities of the Association. He has served on numerous technical committees of the Gray Iron Division, and as Chairman of the Northeastern Ohio Chapter.

Born in Brooklyn, N. Y., he received his engineering education at the University of Cincinnati. In 1926, he became a student apprentice of the foundry of the Cincinnati Milling Machine Co., Cincinnati, Ohio, and in 1929 resigned to engage in alloy cast iron development as foundry engineer for Williams and Co., Inc., Cincinnati and Cleveland, Ohio. In 1933, he assumed duties as superintendent, Sterling Foundry Company, and recently assumed his present position.

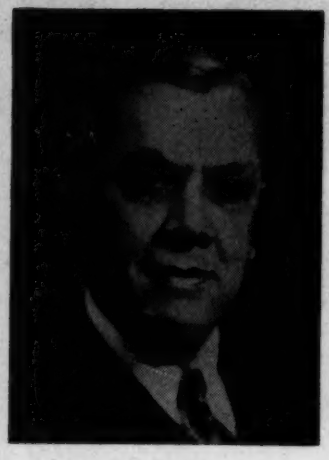
Mr. Dost has written extensively for the technical press, his articles

(Concluded on Page 31)

Joseph Sully,
Nominee for Director

R. T. Rycroft,
Nominee for Director

S. D. Russell,
Nominee for Director



W. L. Woody

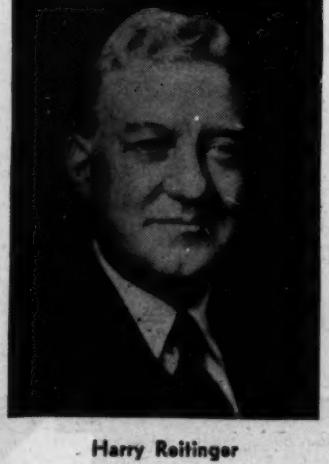
Max Kuniansky

I. R. Wagner

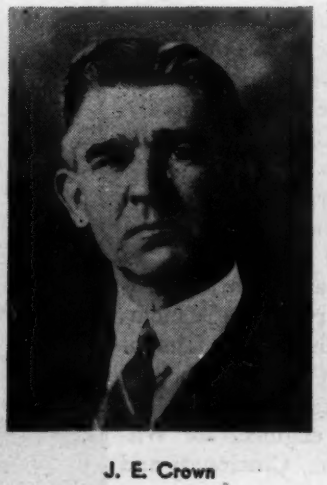
Wm. B. Wallis

D. P. Forbes

H. S. Simpson



Harry Reitinger



J. E. Crown

Roy M. Jacobs

S. V. Wood

L. N. Shannon

Vaughan Reid

J. G. Coffman

M. J. Gregory

Officers and Directors

(Concluded from Page 29)

dealing with the manufacture and use of high-test alloy iron castings in machine tool construction.

Joseph Sully

JOSEPH SULLY, Sully Brass Foundry, Ltd., Toronto, Ontario, Canada, has been nominated for a three-year directorship of your Association. Mr. Sully, best known as "Joe," is a past Chairman of the Ontario Chapter and was instrumental in its organization.

Joe Scully comes from a family of foundrymen. His father, Joseph Sully, Sr., was a practical foundryman, who served his apprenticeship in Belfast, Ireland. Director-elect Sully was born in Toronto and received his education in the schools there and in Montreal. He is active as a director in Y.M.C.A. work and a past director of Rotary Club of Toronto.

His first business connection was with the Canadian Express Co., and later with the C. A. Dunham Co., Ltd., Toronto, where he engaged in sales and advertising work. In 1921, he organized the Sully Brass Foundry, Ltd., which was founded and operated as a private business by his father. In 1929, his company became affiliated with Neptune Meter Co., New York and Toronto. Since 1921, Mr. Scully has been very much interested in the activities of the American Foundrymen's Association, particularly those of its Canadian members.

R. J. Allen

Samuel D. Russell

SAMUEL D. RUSSELL, who has been nominated for a three-year directorship of your Association, and will represent the West Coast membership, is president, Phoenix Iron Works, Oakland, Calif., and is a native of San Francisco. His early education was obtained in the public schools of Oakland.

He began his career in the foundry industry at the age of 12 years with the Phoenix Iron Works, Oakland, the organization of which he is now president. For six years, he worked as a patternmaker, but became interested in actual foundry operations and later became a molder. He gradually rose to positions of increasing responsibility in the company until in 1926 he was made president.

Mr. Russell has been active in the interests of A.F.A. for many years, particularly in the West Coast region. He has served in various capacities as a member of the Northern California Chapter, which he took an active interest in organizing, and later served as its chairman.

In addition to membership in A.F.A., Mr. Russell is a member of the American Society for Testing Materials and the Gray Iron Founders' Society.

Cincinnati Chapter Joins Local Council

CINCINNATI District Chapter of A.F.A. has announced that it has become affiliated with the Cincinnati Technical and Scientific Societies Council. This Council has been organized for the purpose of acquainting members of all scientific and technical societies with the activities of each organization, and to prevent as much as possible the staging of meetings of organizations having overlapping membership on the same date. Its purpose is to enlarge the scientific knowledge of members of the cooperating societies throughout the Cincinnati area and to avoid duplication of effort.

H. W. Gillett to Deliver Second Annual Foundation Lecture

THE 47th Annual Meeting of your Association in St. Louis, Mo., last year, saw the inauguration of a new feature of the annual meeting program, namely, the A.F.A. Foundation Lecture. The first lecture was presented by John W. Bolton, The Lunkenheimer Co., Cincinnati, Ohio, and was entitled "Foundry Metallurgy in the Castings Industry."

In line with the policy of the A.F.A. Lecture Committee, which chooses the annual lecturer, to secure outstanding foundry technologists as speakers, H. W. Gillett, Technical Advisor, Battelle Memorial Institute, Columbus, Ohio, has been chosen to deliver the second A.F.A. Foundation Lecture at the Third War Production Foundry Congress. He has chosen for his subject "Cupola Raw Materials." Dr. Gillett is recognized both nationally and internationally as an outstanding authority on metals behavior and manufacturing process. He will deliver the second A.F.A. Foundation Lecture at the Annual Business Meeting of the Association, held Thursday, April 27.

Dr. Gillett received his technical education at Cornell University, Ithaca, N. Y. Following his graduation, he worked for one summer as chemical analyst in the laboratory of the late Thomas A. Edison, and then returned to Cornell University for graduate work. Wishing to mix the commercial research viewpoint with the academic one, he interrupted his graduate work by a year in the laboratory of A. D. Little, returning to Cornell to finish his work in connection with his Ph. D. degree in chemistry and electrothermics.

Dr. Gillett states modestly that his entrance into metallurgy and foundry work came about accidentally, as the most interesting opening, on completion of his graduate work, was that of manager, Research Department, Aluminum Castings Co. This job gave him an introduction to the problem of aluminum and brass foundries.

The U. S. Bureau of Mines was interested in conservation of metal resources and reasoned that the electric brass melting furnace offered possibilities. Dr. Gillett's interest in electrothermics and in the foundry, lead to his selection to carry on research work concerning the use of the electric furnace as a brass melting medium. The electrothermic equipment at Cornell University was made available to the Bureau of Mines, and for a dozen years, Dr. Gillett and associates operated the Ithaca field office, first surveying fuel-fired, brass furnace operations, and then experimenting with electric furnaces for melting brass. The furnaces used were types other than the induction furnace, which was developed later.

This electric furnace work lead to the initial design of the rocking, indirect-arc type furnace, which later was taken over and developed by commercial interests. Prior to the days when the high-frequency induction furnaces became available, the electric, indirect-arc, rocking-type furnace was considered to be the most convenient small-scale steel-making furnace for laboratory use.

When the first World War brought its problems, the facilities of the Ithaca office of the Bureau of Mines were brought to bear on some of those problems relating to steel manufacture. At that time, zirconium was being advocated as an alloying element, not as an addition element, in light armor plate. The Ithaca office did much work making ingots which were rolled into plate in the Bureau of Standards, and later given ballistic tests by the Navy. As a result of these tests, it was concluded that zirconium was no better as an alloying element for light armor than silicon, and that the use of shipping to bring zirconium ore for that particular use was not necessary. Another war problem was the electric smelting of low-grade domestic manganese ores.

The last couple of years that Dr. Gillett spent in Ithaca were devoted to the study of the fatigue of metals. These problems gave him an introduction to ferrous metallurgy, and in his next position, as Chief, Metallurgical Division, U. S. Bureau of Standards, he dealt with both ferrous and non-ferrous matters, including high temperature behavior, corrosion, wear and fatigue problems.

Following five years of this broadening work in metallurgical research, Dr. Gillett assumed duties as director of the newly established Battelle Memorial Institute, Columbus, Ohio. The work on foundry problems at the Institute is familiar to A.F.A. members, as numerous members of the staff have presented results of considerable work in papers before the Association. The duties as director of Battelle later were turned over to Clyde Williams, on the request of Dr. Gillett, so that he could devote himself to the more congenial duties as technical advisor.

From the time Dr. Gillett came to Battelle until the pressure of war work in World War II made necessary the cessation of such activity, he served as editorial director of the magazine *Metals and Alloys*. He wrote

many correlated abstracts for this magazine and thus acquired the faculty of bringing existing technical information together and giving it an engineering slant. Dr. Gillett also cooperated in the editorial work on some of the "Alloys of Iron" monographs, in revision of "Steel and Its Heat Treatment," originally written by D. K. Bullens, and on a book written at the request of the Navy on "Prevention of the Failure of Metals Under Repeated Stress." He also has worked on a report on the low-temperature behavior of metals for the American Society of Mechanical Engineers and American Society for Testing Materials, and more recently for the War Metallurgy Committee on the report on "Selection of Metallic Materials." As a member of the War Metallurgy Committee, Dr. Gillett has drafted several reports to the War Production Board on metallurgical topics relating to conservation, and is engaged in other war work for the Services.

Dr. Gillett's work has been recognized by numerous technical groups. In 1931, he received the John A. Penton Gold Medal of A.F.A., and in 1939 was honored by his selection to present the Howe Memorial Lecture of the American Institute of Mining and Metallurgical Engineers. In 1942, he prepared the Edward Williams Lecture for the Institute of British Foundrymen.

Dr. Gillett is a great lover of dogs. He states that the above honors are topped by the ribbon and trophy he received last fall by placing two of his English setters in the dog trials of the Columbus Bird Dog Club.

Buffalo Congress Committees

(Continued from Page 27)

B. T. Hain, American Radiator & Standard Sanitary Corp.
H. B. Hanley, American Laundry Machinery Co., Rochester.
W. L. Harbrecht, Electro Metallurgical Co., Niagara Falls.
L. S. Harwood, General Motors Corp. (Harrison Radiator Div.), Lockport.
F. G. Hendler, Aero Pattern Works.
A. J. Heysel, E. J. Woodison Co.
W. D. Hunsicker, Worthington Pump & Machinery Corp.
E. R. Jones, Lumen Bearing Co.
J. Kaufer, Tanner Mfg. Co., Erie, Pa.
I. J. Kaufmann, Rochester Smelting & Refining Co., Rochester.
H. B. Klar, Osborn Mfg. Co., Kenmore.
S. A. LeViness, Combined Supply & Equipment Co.
D. Levinson, Acme Steel & Malleable Iron Works, Inc.
R. W. Lewis, Symington-Gould Corp., Rochester.
D. Loomis, General Railway Signal Co., Rochester.
G. L. Loud, General Motors Corp. (Harrison Radiator Div.), Lockport.
R. J. Maddison, Whitehead Bros. Co., New York.
J. E. Maher, Jamestown Iron Works Co., Jamestown.
J. Marthia, Jewell Alloy & Malleable Co., Inc.
G. T. Mason, Alloys & Products, Inc., Rochester.
W. D. Mathers, American Magnesium Corp.
A. Mathieu, Dussault Foundry, Lockport.
V. M. Mazurie, Buffalo Foundry & Machine Co.
L. A. Merryman, Tonawanda Iron Corp., North Tonawanda.
W. J. McGennis, Electro Refractories & Alloys Corp.
J. E. McHenry, Gleason Works, Rochester.
C. S. McMath, E. J. Woodison Co.
C. J. Menzemer, Frederic B. Stevens, Inc.
L. J. Moriarity, Dunkirk Foundries, Inc., Dunkirk.
J. A. Morrissey, Industrial Silica Corp.
W. F. Morton, The Anstice Co., Inc., Rochester.
D. P. Murphy, Symington-Gould Corp., Depew.
J. H. Neal, United States Army.
J. Nixon, Whitehead Metal Products, Inc., of New York.
T. M. O'Brien, Clark Brothers Co., Olean.
R. Pattison, Pratt & Letchworth Co.
H. O. Pels, General Motors Corp. (Harrison Radiator Div.), Lockport.
A. M. Petz, Symington-Gould Corp., Depew.
E. A. Piper, Pohlman Foundry Co., Inc.
P. A. Pratt, Symington-Gould Corp., Rochester.
A. F. Preuster, International Graphite & Electrode Corp., Niagara Falls.
R. Putnam, Symington-Gould Corp., Rochester.
A. Rankin, Lake Erie Engineering Corp., Kenmore.
H. K. Rose, Swan, Finch Oil Corp.
G. B. Ross, Republic Steel Corp.
W. H. Rother, Buffalo Foundry & Machine Co.
J. H. Sander, Am. Radiator & Standard Sanitary Corp.
J. A. Saver, Symington-Gould Corp., New York.
H. Schnier, Pohlman Foundry Co., Inc.
D. M. Scott, Allegheny-Ludlum Steel Corp.
J. E. Sharp, Scott Aviation Corp., Lancaster.
J. A. Shaw, International Graphite & Electrode Corp., Niagara Falls.
R. Sheffield, Bovaird & Seyfang Mfg. Co., Bradford, Pa.
E. J. Sierk, General Motors Corp. (Harrison Radiator Div.), Lockport.
A. E. Smith, National Engineering Co.
N. S. Snyder, Link Belt Co.
D. R. Steele, Progressive Foundry Works, Brockport.
I. Stohle, Symington-Gould Corp., Depew.
A. H. Suckow, Symington-Gould Corp., Depew.
H. G. Swan, Symington-Gould Corp., Depew.
W. H. Taylor, Worthington Pump & Machinery Corp.
T. Teeters, Electro Refractories & Alloys Corp.
J. R. Turner, Queen City Sand & Supply Co.
P. Totaro, Jewell Alloy & Malleable Co.
A. W. Van Vleck, Whitehead Bros. Co., Royal Oak, Mich.
W. J. Venus, Jewell Alloy & Malleable Co., Inc.
R. A. Wade, Pratt & Letchworth Co.
R. E. Walther, Whiting Corp.
W. C. Weaver, Symington-Gould Corp., Lancaster.
R. T. Wedgewood, Pickands, Mather & Co., Erie, Pa.
L. H. Wells, N. Ransohoff, Inc., & Clearfield Machine Co., Rochester.
A. Westons, Clark Brothers Co., Olean.
J. L. Yates, Worthington Pump & Machinery Corp., Kenmore.

Chapter Delegates to Discuss Their Problems

AT 4:00 p.m., Wednesday, April 26, two delegates from each of the 27 chapters of the Association will meet with Vice-President and President Elect R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich., and Vice-President Nominate F. G. Walls, International Nickel Co., Inc., Detroit, to discuss problems arising in their chapters and to receive suggestions from other chapter delegates on how similar problems have been handled by their respective groups. All chapters have been invited to notify the National Office of subjects which they would like to have discussed.

Following the delegate meeting, the Annual Chapter Officers Dinner will be held at 6:00 p.m., at which the discussion of chapter problems will be continued. Both the delegate meeting and the officers dinner are held, not only for the purpose of discussing mutual problems, but also to promote acquaintanceship among the active workers in chapters.

To

A. W. Gregg

The J. H. Whiting Gold Medal

"For Development Work on Steel Melting Practices"

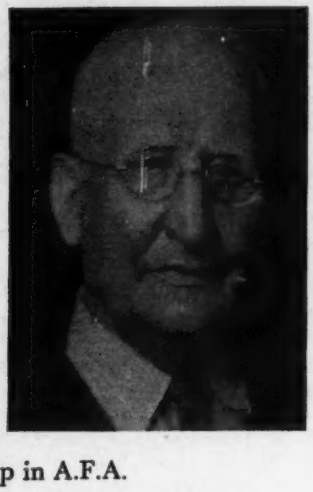
To

W. G. Reichert

The Jos. S. Seaman Gold Medal

"For Educational and Research Work in Foundry Sand Control"

CITATIONS FOR OUTSTANDING SERVICE

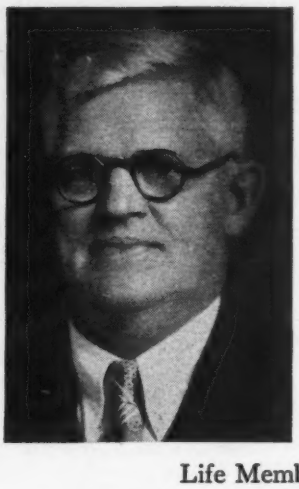


To

John Hill

Life Membership in A.F.A.

"For long and continued interest in the Association"



To

Herman E. Alex

Life Membership in A.F.A.

"For long and continuous efforts in behalf of the Foundry Industry and the Association."

LIST OF A.F.A. MEDALISTS

1924— John Howe Hall
*Enrique Touceda
1925—*Richard Moldenke
Robert John Anderson
1926— Thomas Turner, England
John Shaw, England
*E. V. Ronceray, France
1927—*Robert Alexander Bull
1928—*Alexander E. Outerbridge, Jr.
1929—*Jesse Lee Jones
1930— Dr. Harry A. Schwartz
1931—*Ralph S. MacPherran
1932—*La Verne W. Spring
Dr. Horace W. Gillett
1933— Dr. Gulliam H. Clamer
1934— Arnold Lenz
1935— Lawrence Lee Anthes
1936— David McLain
Dr. Heinrich Ries
1937— John Ward Bolton
Charles Willers Briggs
Dr. James Tucker MacKenzie
1938—*Frederick Ayres Lorenz, Jr.
1939—*Donald James Campbell
Harold Sands Falk
James Ramsay Allan
1940— Frederick Ketchum Vial
Nathaniel K. B. Patch
Harry Walter Dietert
Frederick A. Melmoth
1941— Donald James Reese
Max Kuniansky
Frederick Louis Wolf
Charles Edgar Hoyt
1942—Alfred L. Boegehold
John E. Galvin
1943— Rufus F. Harrington
Carl F. Joseph

*Deceased.

IN MAY, 1923, Joseph S. Seaman, president of A.F.A., 1899-1900; John A. Penton, first secretary of A.F.A., 1896-1899; William H. McFadden, president of A.F.A., 1906-1907; and J. H. Whiting, vice president of A.F.A., 1906, each donated an equal sum of money, the revenue from which was to be used for the purpose of encouraging and stimulating meritorious efforts in the metal castings industry. A Board of Awards, consisting of the last seven living past presidents of the Association, was created by the A.F.A. Board of Directors to administer the funds and to recommend to the Board of Directors persons whose contributions, in accordance with agreements with the donors, should be recognized. Medals were created and named after the four donors. The first awards were made in 1924, and a list of the past recipients is shown on the accompanying page.

This year the Board of Awards has chosen W. G. Reichert, W. G. Reichert Engineering Co., Newark, N. J., to receive the Joseph S. Seaman Gold Medal, and A. W. Gregg, Whiting Corp., Harvey, Ill., to receive the J. H. Whiting Gold Medal. Life Membership in your Association, by action of the Board of Directors on the recommendation of the Board of Awards, has been awarded to John Hill, president, Hill & Griffith Co., Cincinnati, Ohio, a charter member of A.F.A., and to Herman E. Alex, Rock Island Arsenal, Rock Island, Ill., who has served that organization for over 50 years. Short biographical sketches of these men follow:

TO THE CASTINGS INDUSTRY

BIOGRAPHIES

W. G. REICHERT

WILLIAM GEORGE REICHERT, president, G. W. Reichert Engineering Co., Newark, N. J., who will receive the Joseph S. Seaman Gold Medal of the American Foundrymen's Association at the Annual Business Meeting, is very well known to the foundrymen of the country. Mr. Reichert has been active for many years in National committee work, particularly in the activities of the Foundry Sand Research Committee. He has spoken on various foundry topics relating to castings production, especially sand control, before many chapters of your Association. He has prepared numerous papers dealing with the subject of foundry sands and is the author of a book, soon to be published by the Association, entitled "Molding Sand Practice and Control." In 1933, Mr. Reichert presented the annual exchange paper to the Institute of British Foundrymen.

His citation, for which he has been awarded the Joseph S. Seaman Medal, reads "In recognition of his outstanding service to the Foundry Industry and the Association, especially for his work in the educational and research fields of Foundry Sand and Its Control."

Born in Elizabeth, N. J., Mr. Reichert was graduated from Polytechnic Institute of Brooklyn in chemical engineering. He began his foundry career with the Singer Mfg. Co., Elizabeth, in 1918, first as chemist, later as engineer of tests and, finally, as metallurgical engineer. He remained with that company until 1939 when he accepted the position as general foundry metallurgist for all divisions of the American Brake Shoe Company with headquarters at Mahwah, N. J. His work in this capacity included metallurgical control of the foundries of not only the parent company but those of the American Manganese Steel, Southern Wheel and the National Bearing Metals Divisions, over 40 foundries in all.

Mr. Reichert has been especially active in work of the A.F.A., having presented numerous papers on a variety of subjects at A.F.A. conventions and to the American Society of Mechanical Engineers. Among the National committees on which Mr. Reichert has served are the Gray Iron Division Committee on Analysis of Defects; Executive Committee, Foundry Sand Research Committee, and on its sub-committees on Grading and Fineness, Flowability, Physical Properties of Steel Foundry Sands at Elevated Temperatures, and Paper Review; Cupola Research, Sub-Committee on Pig Iron and Sub-Committee on Scrap.

In addition to his active participation in National committee work, Mr. Reichert has served as a director of the Metropolitan Chapter. He is also a member of the American Institute of Mining and Metallurgical Engineers and its Institute of Metals Division.

A. W. GREGG

ALFRED WILLIAM GREGG, executive engineer, Whiting Corp., Harvey, Ill., has been awarded the J. H. Whiting Gold Medal of A.F.A., "in recognition of his outstanding contributions to the Foundry Industry and the Association, especially for his work in the development of Steel Melting Practices."

Mr. Gregg is well known to the foundry industry, having spoken before many chapters of A.F.A. on a variety of subjects and having been actively interested in many National committee activities, including those

of both the Steel and Gray Iron Divisions. He has presented numerous papers on steel foundry practice at annual meetings and has presided at sessions.

Mr. Gregg is a native of Illinois and received his education in the public schools of Chicago. He later attended Purdue University, Lafayette, Ind., from which he was graduated with a B.S. degree in 1903, and an M.S. degree in chemistry in 1904. He then entered on a career during which time he was associated with Bucyrus-Erie Co., Milwaukee, Wis.; Latrobe Steel Co., Latrobe, Pa.; American Manganese Steel Co.; Bonney Floyd Co., Columbus, Ohio; and Farrell Cheek Foundry Co., Sandusky, Ohio. He resigned his position as foundry manager, Farrell Cheek Foundry Co., to become associated with the Whiting Corporation. His successful work there lead to his appointment as executive engineer, the position he now holds.

Mr. Gregg is an extremely active member of your Association—a real enthusiast for the foundry industry. One of his greatest contributions has been his championing of the converter process for making steel for castings.

HERMAN E. ALEX

HERMAN E. ALEX, who will be honored with Life Membership in your Association at the Annual Business Meeting on Thursday, April 27, began his foundry career in 1889 with the Davenport Machine & Foundry Co., Davenport, Iowa. Mr. Alex is a native of Davenport and has spent his entire foundry career in the Quad City area. Since 1892, he has been associated with the Rock Island Arsenal, Rock Island, Ill. On September 12, 1943, he was recognized as the oldest ordnance worker in point of service in any government ordnance plant in the United States, having served, at that time, 52 years.

For many years Mr. Alex has been very much interested in the activities of foundrymen in the Quad City area, as is indicated by the fact that he is a charter member of the Quad City Foundrymen's Association, now the Quad City Chapter of A.F.A. In 1939, he was elected chairman of the Quad City Chapter and has served on its Board of Directors. He also has participated actively in work of National committees.

Herman, as he is known to many of his friends, has had the privilege in his time of being associated with many of the leading military men in the country, including Major General L. A. Campbell, Jr., Chief of Ordnance, Washington, D. C.

The Life Membership in your Association has been awarded Mr. Alex for long and continuous efforts in behalf of the Foundry Industry and the Association.

JOHN HILL

JOHN HILL, who will be awarded Life Membership in your Association at its Annual Business Meeting is president, Hill & Griffith Co., Cincinnati, Ohio. Mr. Hill is a charter member of A.F.A., having attended the organization meeting in 1896 as a representative of the S. Obermayer Co., Chicago, Ill. In March, 1898, Mr. Hill was instrumental in the formation of his present company. Not only he, himself, but members of his organization have taken, and are taking, an active part in both National and Chapter activities. Mr. Hill has missed only one convention of A.F.A. since its organization. He attended also the First International Foundry Congress in Paris in 1923. In the early days of the Association, Mr. Hill took a very active part in its affairs.

Because of his long and continued interest in the Association, Mr. Hill has been awarded Life Membership.

Foreman Training Subjects Will Be Discussed

AT a session at 8:00 P.M. Tuesday, April 25, of which W. G. Conner, Jr., Walworth Co., Washington Park, Ill., Chairman of the Foreman Training Committee, will preside, that subject will be discussed on a broad basis. Five papers have been prepared dealing with various types of foreman training programs and also the new problems facing foremen due to the entrance of women into the industry.

"Training Foremen on the Job" will be the subject discussed by F. K. Dossett, Thompson Aircraft Products Co., Cleveland, Ohio. W. J. Hebard, Continental Roll and Steel Foundry Co., East Chicago, Ind., will speak on "Training Foremen to Handle Women." Another phase of this problem will be discussed by S. M. Brah, Rustless Iron & Steel Corp., Baltimore, Md., who will explain "Women as Foremen." The requirements of "The Post-War Foreman" will be dealt with by T. H. Booth, Walworth Co., Washington Park, Ill., while Steven G. Garry, Caterpillar Tractor Co., Peoria, Ill., will discuss "Training Foremen Through the Conference Room Method."

The session on Foreman Training will be preceded at 6:00 P.M. by a dinner for those interested in Foreman Training. The dinner is being held to promote acquaintanceship among those interested in this subject. Knowing the food situation in general, those who expect to attend this dinner are requested to indicate that they will attend on the Preprint Request Form with their credential cards, which was forwarded to all members of the Association. Your cooperation in this respect will be sincerely appreciated and will greatly aid in making the Third War Production Congress a success.

Malleable Division Studies Gating and Risering

THROUGH the efforts of the Program and Papers Committee of the Malleable Iron Division, and in accordance with the program policy set up by the Division, a Symposium of two sessions is being held on Gating and Risering Practices for malleable iron castings. The symposium will consist of six papers. These sessions are scheduled for 2:00 p.m., Tuesday, April 25, and 9:30, Wednesday, April 26, and should be of wide interest.

Following the presentation and discussion of these papers at the Symposium sessions, the papers and discussions will be published under one cover as have the previous symposiums on melting and graphitization of malleable iron. They will be available, not only in the *Transactions* of the Association, but as separate books, at a nominal cost to members.

Melting to be Brass and Bronze Subject

THE round table conference of the Brass and Bronze Division, under the chairmanship of B. A. Miller, Cramp Brass & Iron Foundries Div., Baldwin Locomotive Works, Philadelphia, this year will feature "Melting" as its subject. Five members of the Association will discuss melting practices for five types of furnaces. F. L. Wolf, Ross-Tacony Crucible Co., Philadelphia, will discuss the crucible process; Leighton M. Long, Consultant, Toledo, Ohio, the cupola process; H. M. St. John, Crane Co., Chicago, the indirect-arc electric furnace process; Henry Gieseke, Ajax Metal Co., Philadelphia, the low frequency induction process; and Frank T. Chestnut, of the same company, the high frequency induction process. R. W. Parsons, Ohio Brass Co., Mansfield, Ohio, who has had extensive experience with all of these types of melting units, will act as summarizer for the meeting.

In the past, these Brass and Bronze Round Table Conferences have been extremely popular. Attendance has ranged from 300 to 500. During this war period, food requirements must be considered. Therefore, when Preprint Order Blanks are sent to members, a special form has been enclosed on which members are requested to indicate if they will attend this Round Table Conference and the number of reservations required.

It is requested that this information be forwarded to the National Office in Chicago at the earliest possible convenience so that proper plans can be made for this meeting. This year, because of food requirements, attendance will be limited to 400. The meeting will be held in the Niagara Room, Statler Hotel, Thursday, April 27, 12:30 p.m. Please send in your reservations as soon as possible.

A.S.T.M. Considers High Temperature Cast Iron Uses

MEMBERS of Subcommittee XXII of Committee A-3, American Society for Testing Materials, held a meeting during the spring committee meetings of that organization to discuss proposed specifications for gray iron castings for high temperature pressure vessels. This proposed specification had been prepared by J. S. Vanick, International Nickel Co., N. Y., Chairman of the Subcommittee, as a basis for discussion.

Among the points brought up in a discussion of the proposed specification was that the top temperature of application for cast iron should be 650° F. This is 200° higher than that specified by the present A.S.M.E. Boiler Code. The proposed specification listed application temperatures for the various classes of cast iron based on tensile strength as contained in A.S.T.M. Specification A 48-41. It was the consensus of opinion at the meeting that classes 20, 25 and 30 should be deleted as not being acceptable for high temperature service on the basis that temperatures up to 450° F. are not considered high temperatures. Exceptions were taken to parts of the specification which stated that it was necessary to cool castings for high temperature applications in the mold, and also to the suggested heat treatment for stress relief for castings for high temperature applications.

Another point which received consideration was that a standard of quality requirement be written into the specification, so that foundries inexperienced in the manufacture of the castings for high temperature applications would be discouraged from entering that field.

The proposed specification had set up allowable maximum temperatures for application as high as 700° F. for the higher strength classes of irons. It was felt that by keeping the maximum application temperature to 650° F. that not too high a jump over the previously-mentioned limit, as described by the A.S.M.E. Boiler Code, would lead to recognition of any high temperature specification promulgated by A.S.T.M. for cast iron with less difficulty, and that those companies in the industry which were manufacturing high temperature castings could make a product to meet those temperature requirements and, therefore, could more readily justify the increase over the present 450° F. temperature limitation.

The discussion of the proposed specification brought out that further study is needed before a tentative specification can be issued to cover the application of cast iron at higher temperatures than is now provided in the A.S.M.E. Boiler Code. Chairman Vanick, in view of this required study, will undertake to rewrite the proposed specification with a view to presenting it for review at a meeting of the Subcommittee at the Third War Production Foundry Congress in Buffalo, April 25 to 28.

Inspection Committee Holds First Meeting

ORGANIZED in the fall of 1943 under the chairmanship of M. D. Johnson, Caterpillar Tractor Co., Peoria, Ill., the A.F.A. Committee on Castings Inspection is holding the first session ever staged under its sponsorship on Wednesday, April 26. L. A. Danse, General Motors Corp., Detroit, Mich., will discuss "The Consumer's Viewpoint on Castings," while R. V. Elms, Sperry Gyroscope Co., Inc., Brooklyn, will discuss "Some Aspects of Casting Inspection as Seen by a Purchasing Agent." Navy inspection Standards will be discussed by C. L. Frear, Bureau of Ships, U. S. Navy Yard, Washington, D. C. Following the presentation and discussion of these papers, E. F. Platt, Sperry Gyroscope Co., Inc., Brooklyn, will summarize the meeting.

From the manner in which the Committee has worked to stage this meeting and from the enthusiastic endorsement of their work among the membership, this should prove to be one of the most interesting meetings of the Congress.

Robert L. McIlvaine has been made vice president and general sales manager, National Engineering Co., Chicago. Mr. McIlvaine formerly was manager of engineering sales.

4-Part CHEEK METHOD of PRODUCING CAST IRON CYLINDERS

Fig. 1—View of cast iron, low pressure steam cylinder casting.

Fig. 2—Drag flask resting on drag pattern board.

By ROBERT HENDRY,
Beloit Iron Works, Beloit, Wis.

War production has made many unusual demands. When the facilities of the Beloit Iron Works, which specialized in manufacturing paper machinery in the pre-war era, had to be converted to building marine steam engines, a method of production, combining speed with efficiency, had to be adopted—this was the 4-Part Cheek Method, described in the accompanying article.

WHEN the United States entered the present World War, it was known that thousands of ships would be required—some to carry supplies to our far-flung battle fronts, and others to guard their precious cargoes, so necessary to the success of our armed forces. Ship building became a "must."

As the ship building tempo increased, a demand was generated for steam engines for propulsion of certain types of ships. Cast iron foundries were contacted and confronted with the problem of producing high, medium and low pressure cylinders for such steam engines on a production basis. Various foundries adopted different methods of production.

Fig. 3—Removing cover core prints and loose flanges.

When the company with which the writer is associated was asked to make low pressure steam cylinders, it realized that, due to design of the cylinders desired, it was likely to encounter trouble. Representatives of the company visited a number of foundries already engaged in building steam engines and using cylinders of the same type as requested from our company, but with larger diameter bore.

Molding Methods Studied

As a result of observations in the foundries visited, it was discovered that at least five different methods were utilized for molding the cylinders. Some foundries used all cores on the outside and cast the cylinder on end; others used a cheek split into two parts, bottom and top halves. Our representatives found that less scrap castings were made when the castings were molded by the cheek method.

In one foundry visited which used the cheek method, the cores were set in the drag, then the bottom half of the cheek was set on the drag over the cores. The top half of the cheek then was placed in position and the remainder of the cores set into the mold.

Due to the depth of the mold and to the cores being placed one on top of the other, it was necessary that chaplets be used. In addition, considerable dirt collected in the mold, regardless of how carefully the molder set the cores.

As these cylinder castings were re-

Fig. 4—Left—Drawing the drag pattern.
Fig. 5—Right—Completed drag.

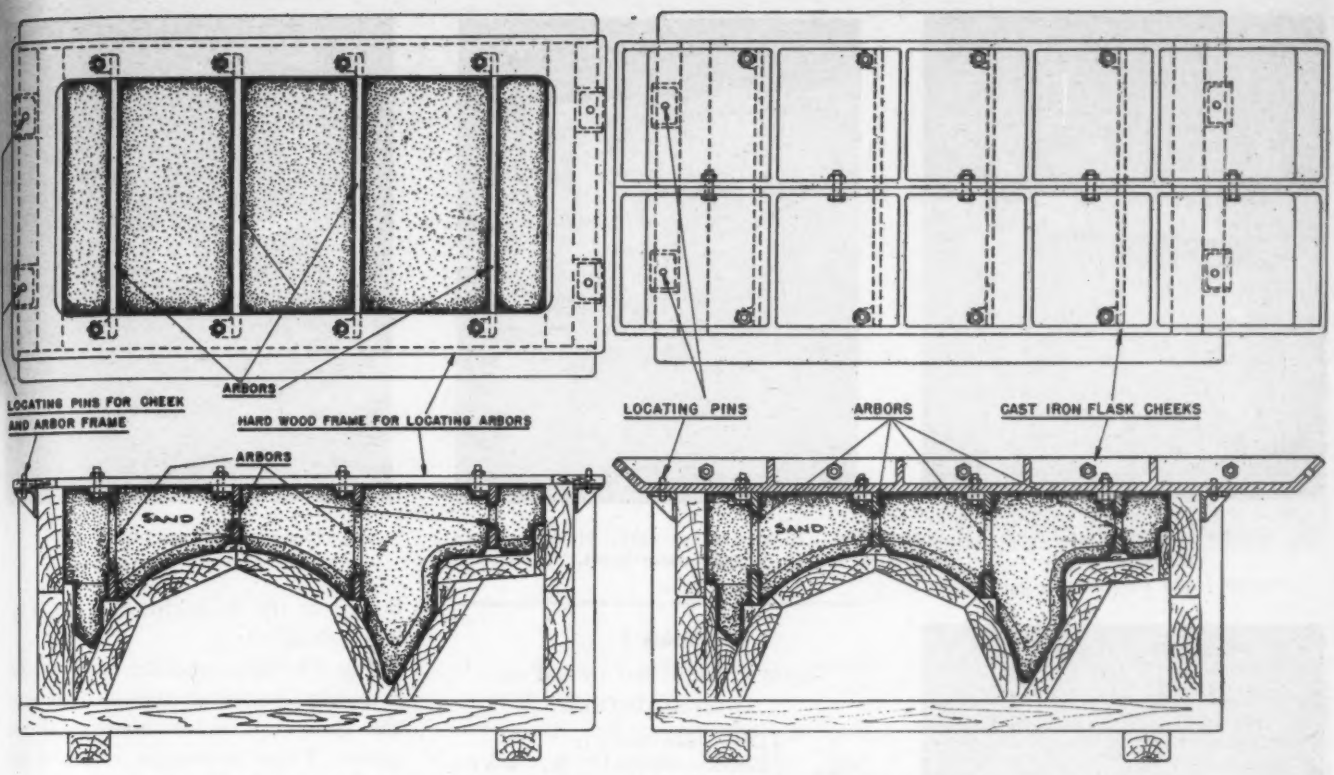


Fig. 7 (left)—Cross section of side cheek core showing arbor locations and method of locating them. Fig. 8 (right)—Cross-section of core box showing side cheek core arbors bolted to side cheek flask section.

quired to withstand water pressure, elimination of dirt was very important. Also, due to the design of the outside portion of the casting, cores had to be used, because of the manner in which the pattern had to be drawn from the cheek.

Many Cores Eliminated

As a result of visits to various foundries, it was decided that, if a 4-part cheek method of molding was used, many cores would be eliminated. In addition, by ramming the cheeks in the foundry, using molding sand, production pressure —at that time extremely heavy in the core room—would be relieved.

The company with which the author is associated undertook the manufacture of the low pressure cylinder, shown in Fig. 1. As previously stated, our foundry decided to use the 4-part cheek method, as it permitted the internal cores to be set into place before the mold itself was completed, and eliminated the use of chaplets at vital parts of the casting.

Fig. 6—Ramming side cheek core.

Equipment used in the 4-part cheek method, shown in Table 1, consisted of drag, cheek and core flasks, cope and drag patterns mounted on boards, and 27 core boxes of various types. The following is a step-by-step illustrated description of the molding of the previously mentioned low pressure cylinder:

Molding the Drag

Fig. 2 shows the drag flask resting on the drag pattern board with the molder filling the flask for ramming. Weights are placed on the loose flange cover core prints. Pock-

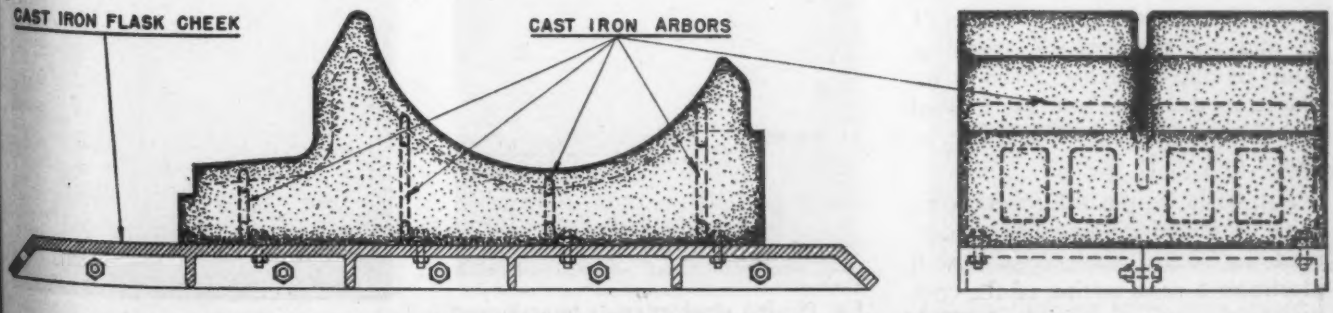


Fig. 9—Cross-section of completed side cheek core mounted on side cheek flask section.

Fig. 10—Locating side of cheek flask on cheek core box.

Fig. 11—Bolting the arbors to the side cheek flask section.

ets under the flanges are secured with rods and gaggers. Fig. 3 shows the molder removing cover core prints and loose flanges. Cover cores are set before the drag is rammed to completion. Fig. 4 shows the drag pattern being drawn, and Fig. 5 shows the completed drag after it has been washed, but before drying.

Ramming Cheek Cores

Core boxes for the side cheek core are approximately 43 x 60 x 21 in. and are rammed with molding sand in the foundry. Arbors are placed in the boxes and are located and bolted to a hard-wood frame, as shown in Fig. 7.

Fig. 6 shows the side cheek core being rammed. Note the gaggers used to secure the core. Fig. 8 illustrates a cross-section of the core box with arbors and cheek flask

Fig. 12—Side cheek core. Note dry sand core down gates.

Table 1

Equipment Used in 4-Part Cheek Method

Flask	Drag—60x94x13 in. Cheek—60x94x43 in. when bolted together at corners. Cope—60x94x13.
Pattern	Cope and drag patterns mounted on boards. 2 core boxes for cheek ends. 2 core boxes for cheek sides. 4 core boxes for port cores. 1 half cylinder core box. 2 core boxes for foot lightening cores. 10 small core boxes. 6 cover core boxes.

side located, and the assembly ready to be rolled over. Fig. 9 shows a cross-section of the completed side cheek core with the location of arbors indicated.

Fig. 10 shows a side of cast iron flask cheek being located on the side cheek core box by loose pins, while Fig. 11 shows the arbors being

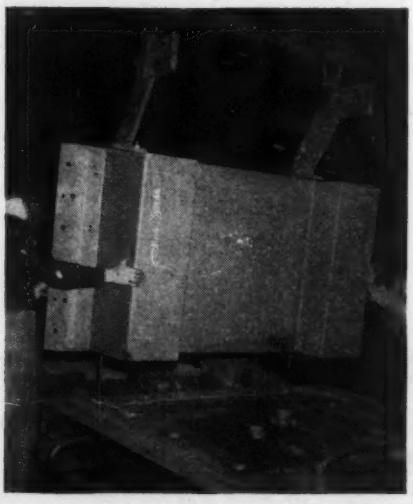


Fig. 14—End cheek assembly being located on drag.

Fig. 13—Washing completed core.

bolted to the flask cheek. (See Fig. 8 for details.)

Fig. 12 shows another view of the drawing operation and also depicts the dry sand cores used as down gates. These cores are rammed up in the core box and are located by holes and loose plugs in the side of the core box. Fig. 13 shows the completed core being washed, prior to drying.

The operations in making the end cheek cores are not shown, as the procedure is exactly the same as that used to make the side cheek cores. End cheek core boxes are approximately 43 x 60 x 14 in., as compared with 43 x 60 x 21 in. for the side cheek core boxes.

Setting Cheek and Cores in Drag

After the side and end cheek cores are made, assembled on their respective parts of the four-part cast iron cheek flask properly coated

Fig. 15—Port cores in position.

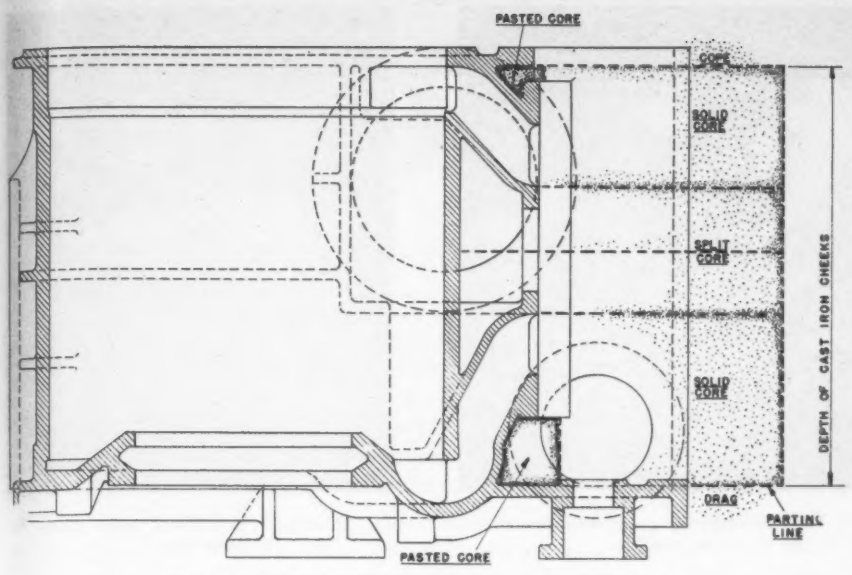


Fig. 16—Section showing port core arrangement.

Fig. 19—Locating side cheek on drag.

with wash and dried, the next operation in the molding procedure is setting the cheek sections and the cores on the drag. Fig. 14 shows an end cheek being located on the drag. The end cheek is bolted into position on the drag flask.

Fig. 15 shows the port cores in position. These port cores are guided into position by the core print impression (Fig. 14) in the cheek end of the assembly. Two lightening cores for the feet are bolted to the drag mold by tapped plates, which are rammed into the loose flange cover core. Fig. 16 shows the arrangement of port cores in the mold. Fig. 17 shows the cylinder diameter core being set.

Fig. 18 shows the side cheek in level position suspended from the crane and ready to be placed on, and bolted to, the drag. Fig. 19 shows the side cheeks being placed in position.

Fig. 20 illustrates the method used to check wall thickness. Note the feeler gage being used to secure accurate mold dimensions. In Fig. 21 the other end cheek is being placed in position to complete the cheek assembly. When the final end has been correctly positioned, the cheek flask sections are bolted together at the corners and also to the drag flask.

Fig. 22 shows a sketch of the cheek assembly. Note that the sections were left open at the mold joints. These sections were rammed up after the cheek was assembled. This procedure eliminated run-outs.

Fig. 23 shows the assembled drag and cheek ready to receive the cope and Fig. 24 shows the cope being located onto the drag and cheek

Fig. 20—Checking the mold assembly for correct section thickness.

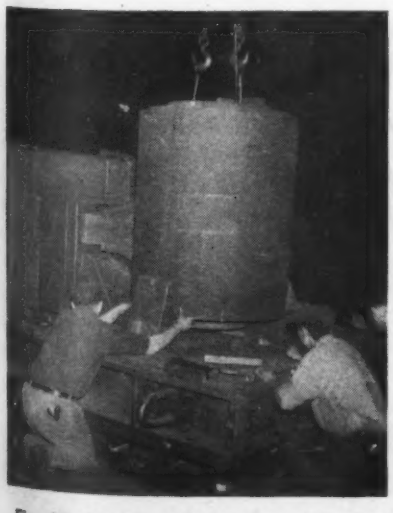


Fig. 17—Setting cylinder diameter core.

Fig. 18—Side cheek in level position.

Fig. 21—Final end cheek being placed in position.

Fig. 23—Drag and cheek assembly with cores in position for closing.

Fig. 25—Placing gates and runner in position.

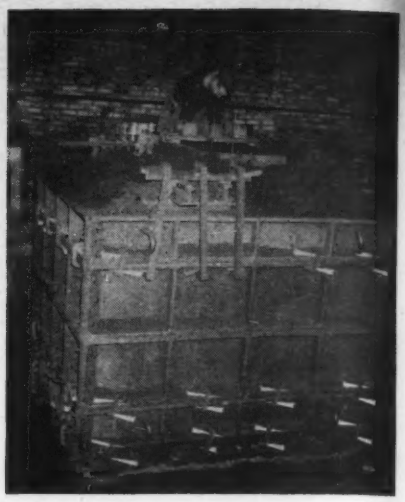


Fig. 26—Mold assembled and ready for pouring.

Fig. 24—Lowering cope.

assembly. The cope is equipped with special bars and a ring for locating shower gates.

Fig. 25 shows the shower gates and runner being placed in position, while Fig. 26 shows the mold completed and ready for pouring.

Conclusion

The foundry with which the author is associated has found the method outlined above to be particularly efficient for the production of the low pressure steam cylinders indicated. The castings produced by this method are clean and pass the water test without failure. Time saved in making cylinder castings by the method outlined is so good that this job has proved to be one of the best in the shop when computed on a tons-per-hour basis.

This method is given to the industry, as it is possible that it may be used for the production of similar castings, especially in cases where a series of built-up cores on both the inside and outside of the mold is required.

Manpower Is Number One Foundry Problem

RECOGNIZING that the No. 1 problem of the Foundry Industry is Manpower, your Association has arranged two sessions which deal specifically with that subject.

The first session is scheduled for Tuesday, April 25, at 11:30 A.M., at which time H. S. Colby, Consultant to Deputy Vice Chairman for Production, War Production Board, Washington, D. C., will speak on "Comments on Selective Program as Developed by War Production Board for the Aid of the Foundry Industry."

The second session will be held at 11:00 A.M. Wednesday, April 26, at which time William F. Patterson, Director, Apprentice Training Service, Washington, D. C., will discuss "Post-War Apprenticeship Problems." Both of these subjects are extremely important.

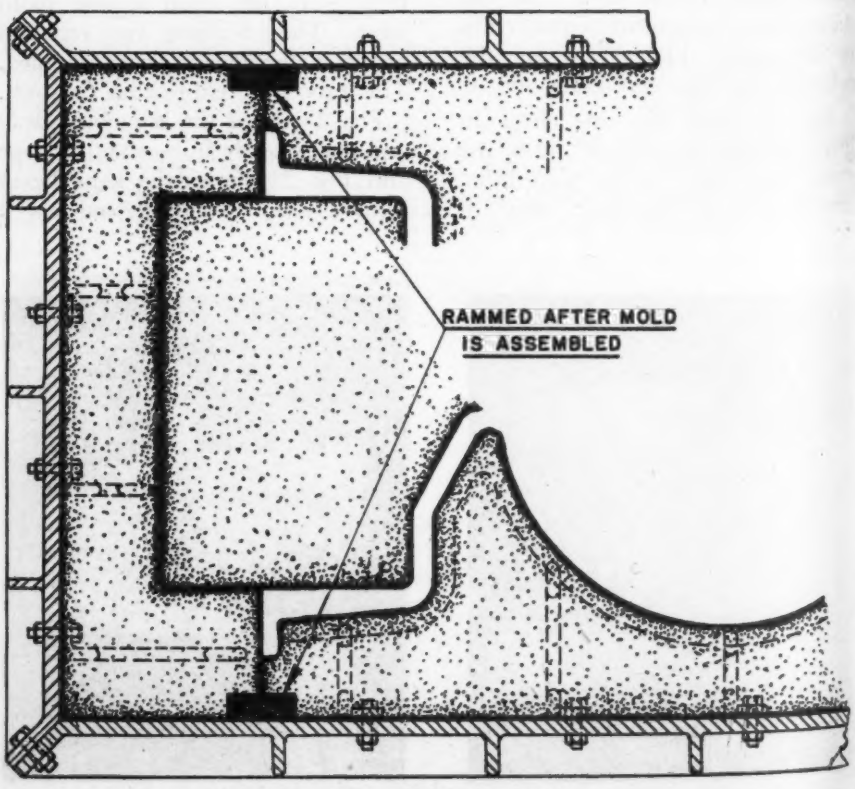


Fig. 22—Cheek assembly showing partings.

REPORT To the Industry

FOLLOWING this introduction are short reports of the various divisions and general interest committees of your Association by the respective chairmen. It is these men, together with certain members of the Board of Directors, who constitute the working body of the Technical Activities Correlation Committee.

While the Technical Activities Correlation Committee is primarily a Board committee, the chairmen of division and general interest committees are the conferees, who assist members of the Board of Directors in their work of directing and correlating the technical activities of the Association.

The foundry industry is putting forth, in this third year of the war, a prodigious effort. This has been reflected in the work of the Technical Activities Correlation Committee, and has broadened its scope. As can be seen by the reports, the work of all divisions, both those long established and new, has expanded to meet the demands of this war situation. The Board members of the Technical Activities Correlation Committee and its conferees, follow closely the intensive effort within the foundry industry, and are coordinating both division and committee activity in such a manner as to assist the industry to the greatest possible extent in these perilous times.

Chairman, A.F.A. Technical Activities Correlation Committee.

Recommended Practices Book Is Published

By William Romanoff,* Chairman, Brass and Bronze Division.

SOME 15 years ago, the then Non-Ferrous Division began to work on a series of recommended practices for the production of sand castings on the various non-ferrous alloys. The work of the Non-Ferrous Division Recommended Practices Committee and its subcommittees has been tied in very closely with the specifications work of the American Society for Testing Materials. Until relatively recently, when a classification for copper-base alloys was promulgated by A.S.T.M., progress in the work was somewhat difficult. Recently, the end point of the work of this committee has been realized by the publication of the first edition of the book "Recommended Practices for the Sand Casting of Non-Ferrous Alloys." In the publication of this work, the Division has had the cooperation of the Committee on Sand Castings of the newly-formed Aluminum and Magnesium Division, of which Dr. N. E. Woldman is chairman. The publication of the Recommended Practices Book is the highlight of the activities of the Division during the past year.

In addition, the Division's Program and Papers Committee is providing two excellent sessions at the Third War Production Foundry Congress, and its Round Table Conference Committee, an excellent session on melting. The Research Committee is engaged in gathering information which will be of vital importance to copper-base alloy casting manufacturers.

The Brass and Bronze Division of the Association will continue to serve the manufacturers of those type castings, and the degree to which it can render service depends primarily upon the support of its technical activities by members in that branch of the industry.

*H. Kramer & Co., Chicago, Ill.

Patternmaking Division Exchanges Information

By Vaughan Reid,* Chairman, Patternmaking Division.

THE Patternmaking Division of A.F.A. was organized for the sole purpose of giving service to the patternmaking industry. It has, and will continue, to bring to the attention of patternmakers new and interesting information about their operations and technique. Since the first sessions sponsored by the division, such subjects as those dealing with the necessity for cooperation between the foundryman, patternmaker and the engineer; rubber coatings for core boxes; pattern lumber; insurance protection for patterns and preservation and building-up patterns by metallizing, have

*City Pattern, Foundry & Machine Co., Detroit, Mich.

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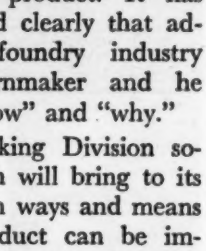
been discussed at annual meetings.

Continuing this policy, the session for patternmakers and supervisors at the Third War Production Foundry Congress again will emphasize the need for cooperation between the patternmaker and the foundryman and will discuss plaster as a patternmaking material.

The Patternmaking Division is interested in both new and old problems that confront the patternmaker and supervisor. Patternmakers want to know about advances on their industry. New manufacturing methods, equipment and materials always are of interest. Because new methods of molding and coremaking are springing into being, the pattern division is interested in how these new methods will affect the manufacture of their product. It has been demonstrated clearly that advances in the foundry industry affect the patternmaker and he wants to know "how" and "why."

The Patternmaking Division solicits papers which will bring to its members' attention ways and means by which its product can be improved and made more useful to its customers—the castings manufacturers.

Gray Iron Division Has Active Year



By F. J. Walls,* Chairman, Gray Iron Division.

THE activities of the Gray Iron Division of your Association have been carried forward very actively during the past year. The work of the Program and Papers Committee is evidenced by the excellent sessions being provided for manufacturers of gray iron castings at the Third War Production Foundry Congress. The Shop Operation Course Committee also has provided an exceptionally fine program for that event.

The Committee on Welding Cast Iron, which has been somewhat dormant this year, is sponsoring a shop operation course on that subject.

During the past year, the Committee on Analysis of Defects has met regularly each month, and is expected soon to complete the first phase of its work.

Work of the High Temperature Properties Committee has resulted in review of the high temperature properties of cast iron by the War Metallurgy Committee, and its recommendations, it appears, will have some influence on the A.S.M.E. Boiler Code and on A.S.T.M. activities, since Committee A-3 of A.S.T.M. is now promulgating a specification for cast iron for elevated temperature use.

The Cupola Research Project Committee has been extremely active during the past year. The material prepared by the various committees for the different sections of the Cupola Operations Handbook has practically all been submitted for editing, and it is expected that the final editorial work will be completed by the fall of this year. If this is accomplished, the Cupola Practices Handbook probably will be available the latter part of this year, or the first part of 1945.

During the past year, considerable interest has been evidenced in gray iron castings and foundations are being laid for the production of an improved engineering material. These improvements will be reflected in the post-war demand for gray iron castings.

*International Nickel Co., Inc., Detroit, Mich.

Malleable Foundries Continue to Progress

By A. M. Fulton,* Chairman, Malleable Iron Division.

AT the 1943 Convention, an outstanding series of papers dealing with the melting of malleable iron was presented. In them no revolutionary changes in practice were described, but rather steady progress in improvement of methods and control.

What was indicated at the 1943 Convention with regard to melting has been true of the other divisions of the malleable castings manufacturer during the past year. There has been steady progress in methods and control. Our branch of the industry is not adaptable to complete mechanization, the degree of mechanization practicable and economical depending upon various factors, including type of production. Where the installation of additional mechanical equipment has indicated potential advantage, such installation has been made. Over a period of years, as indicated in the Annealing Symposium in 1942, and the Melting Symposium in 1943, improvements have been made in melting and annealing equipment.

Malleable production in 1943, and to date, has been at the high level of such years as 1929 and 1941. Plant capacity is adequate for increased production, and additional tonnage is available. Unfortunately, manpower shortage has prevented the industry from even further increasing its output. Efforts to improve the manpower situation have achieved some success, and it is anticipated that 1944 may be a year of even greater production.

At the 1944 Convention in April a well-rounded program dealing

*Northern Malleable Iron Co., St. Paul, Minn.

with malleable iron will be presented. It is hoped that all those who make malleable castings will take advantage of this program, also of the opportunity to discuss their problems at the Round Table Luncheon meeting.

Aluminum and Magnesium Division Reports Progress

By Dr. N. E. Woldman,* Chairman, Aluminum and Magnesium Division.

DUE to the growth and expansion of the work of the Non-Ferrous Division of the American Foundrymen's Association, it was deemed best to subdivide this division and to organize a separate Aluminum and Magnesium Division, divorced from the Copper Alloy Division. As Chairman of this newly formed Aluminum-Magnesium Division, we organized a group of 30 experts in the field of aluminum and magnesium foundry practice and appointed seven subcommittees, each under a subchairman. The subcommittees were to cover: (1) Sand Castings, (2) Die Castings, (3) Permanent Mold Castings, (4) Plaster Molding, (5) Reclamation and Alloying, (6) Programs and Papers and (7) A.F.A. Handbook Review.

These subcommittees have been functioning very diligently and energetically and are gathering together information especially on the recommended practices of the various phases of the light metal foundry industry. It is the aim of the subcommittees to gather all technical and practical information regarding the various foundry practices and also regarding the various metals and alloys used.

After the completion of the revision of the "Recommended Practices," detailed investigations will be made on specific foundry problems pertaining to light metals, such as "The Effect of Microshrinkage on Magnesium Alloys," "The Effect of Mold Design on the Properties of Tensile Test Bars," "The Application of Controlled Direction of Solidification," etc.

The Division is interested not only in the foundry practice in making sound finished castings, but also in reclamation and alloying. In addition, we are interested in the study of the reclamation of secondary alloys, their refining practices and the properties to be obtained therefrom as alternates of primary alloys.

*Eclipse-Pioneer Div., Bendix Aviation Corp.

Steel Division Looks to the Future

By T. N. Armstrong,* Chairman, Steel Division

THE Steel Division represents one of the most active groups of the A.F.A., although it is by no means the largest. Its principal function has been to stimulate an interesting and instructive program for the Annual Meeting and, through its technical committees, keep its members abreast of the latest developments in the steel casting field.

Some of the committees under the Steel Division have been handicapped during the war because of the restrictions imposed by censorship. Others, such as the Committee of Methods for Producing Steel and the Committee on Non-Destructive Testing, have been quite active in assembling information on new methods and making this information generally available.

The Committee on Program and Papers has the most difficult assignment, as it is charged with the responsibility of securing and reviewing the technical papers for the Annual Meeting. How well this committee has performed its duties is reflected in the program for the coming meeting.

The Round Table Committee each year selects subjects of current interest for informal discussion. Such meetings are of considerable value as it permits a free interchange of ideas, many of which are based upon operating experience.

There are many new developments in steel casting which cannot be publicized or discussed in open meetings at this time. The members of the Steel Division are thoroughly familiar with these activities and it is anticipated that through the sponsorship of the A.F.A. a wealth of information will be released at the proper time that will be of inestimable value not only to steel foundries but to industry as a whole.

*International Nickel Co., Inc., New York, New York.

Cost Important in Renegotiation Problems

By R. L. Lee,* Chairman, Cost Committee. Foundry

BELIEVING that renegotiation is one of the most important problems facing the foundry industry at present, the Cost Committee has arranged to have Major Stephen B. Ives, Chief, Financial Analysis Section, Renegotiation Div., Army Service Forces, Washington, D. C., discuss various phases of the subject as related to the foundry industry, at the meeting sponsored by that Committee at the Third War Production Foundry Congress. Major Ives, who has an excellent background for the work he is doing, also will answer questions brought forward by those attending the meeting.

The session sponsored by the Cost Committee is being staged in conformity with its policy of bringing before the industry current factors and problems affecting it. This policy will be continued at future meetings sponsored by the Cost Committee. Renegotiation problems emphasize the importance of proper costs.

*Grede Foundries, Inc., Milwaukee, Wis.

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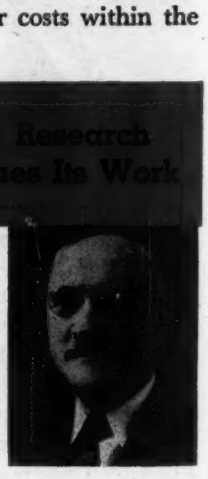
During the war period, the foundry industry has expanded into various fields other than those serviced by it during the pre-war period. These new fields present a challenge to the foundry industry to retain them. In the post-war era, cost will be a much more important factor than it is now, because the ability of the foundry industry to retain the gains it has made will depend on the service, quality and cost of its products. At present, available capacity and necessity are the bases for production, rather than cost alone.

In view of the increasing influence of proper cost, not only in the renegotiation problem, but also in the post-war production problem, the Cost Committee will continue to emphasize the importance of the determination of proper costs within the foundry industry.

Foundry Sand Research Continues Its Work

By Dr. H. Ries,*
Technical Director,
Foundry Sand
Research
Committee



IN SPITE of war conditions the work of the Sand Research Committees has with few exceptions continued with little interruption.

The cooperative program between Cornell University and the Naval Research Laboratory initiated last year and devoted to the behavior of steel sands at elevated temperatures has developed much information on high temperature test equipment and test procedure, and this work is being followed by the testing at elevated temperature of varying mixtures under varying conditions. The investigation is a large and important one. Subcommittees are now being formed to study the behavior of iron, non-ferrous and light metal sands under similar conditions.

Another phase of high temperature work is the sintering test, important in its relation to burning on of sand. Applied initially to steel sands, it has now been tried on iron sands, and it has been found that exactly the same mechanism causes sand adherence to iron castings.

A most promising field for future work stems from the realization that maximum refractoriness is not needed in molding material for light and medium-sized castings, and with the emphasis off refractoriness, attainment of other desirable properties in the molding materials is much easier.

The Subcommittee on Core Testing has done much work in developing special standard tests for core mixtures. The Subcommittee on Light Metal Alloys is working on a program of special tests and procedures to meet the needs of its branch of the foundry industry. A large amount of data has to be correlated and studied.

The important properties of green deformation and toughness, little understood by many foundrymen, are now being standardized by another subcommittee which will also attempt to demonstrate their importance so as to encourage their wider use.

The Grading and Fineness Subcommittee is giving attention to a more precise sub-division of the constituents of A.F.A. clay, by means of the hydrometer. It will help to clear up the problem of why sands with the same A.F.A. clay content behave differently.

Durability and flowability are two still unsolved problems but the work on them has been delayed for the duration.

Not the least important is the preparation of a new edition of the Handbook of Testing Clays and Sands.

These few words show that the research on sand testing is still being actively carried on, for new problems crop up continually. The wide application of sand control is encouraging, and its use cannot fail to increase, but to get the greatest benefits from it the results obtained in the laboratory must be correlated with those obtained in the foundry, and more attention should be given to this.

*Cornell University, Ithaca, N. Y.

Castings Inspection Is Important Problem

By M. L. Johnson,*
Chairman,
Castings Inspection Committee.

THE Committee on Castings Inspection has been in existence only a short time, being created October 13, 1943, as an A.F.A. General Interest Committee because product inspection is common to all branches of the foundry industry. Because of the short life of the committee thus far only a good foundation has been able to be laid. All work has been done by correspondence, telephone calls, and personal contacts where members of the committee have been able to meet on various business occasions. Regardless of these difficulties, the committee has developed an outstanding meeting on Inspection of Castings for the Third War Production Foundry Congress.

There can be no question, at all, as to the value of an inspection committee to the foundry industry, if it is properly managed and organized. Naturally, the justification of any program demands that it have a definite value to the broader program it is intended to aid. This Committee feels positive that, after the convention in Buffalo where the committee will have its first opportunity to discuss this broad and important subject of Inspection, a program for the year 1944 and 1945 can be developed, which will be of material value to the foundry industry. We feel that this commit-

*Caterpillar Tractor Co., Peoria, Ill.

tee is one of the most vital committees to the American Foundrymen's Association program.

Plant Equipment and Maintenance Study Source

By James Thomson,* Chairman, Plant and Plant Equipment Committee.

IT IS the province of the Plant and Plant Equipment Committee to keep in touch with interesting information on foundry equipment and foundry maintenance so as to be able to bring the information to the attention of the foundrymen as opportunity presents itself. At various times, members of the Committee have presented papers on these subjects and also have been instrumental in having interesting papers presented by other foundrymen.

We are firmly of the belief that this type of work should continue into the postwar period and that there should be more attention given to information about Plant Engineering and Maintenance in the future than has been done in the past by the American Foundrymen's Association. Papers along these lines are solicited and will have the serious consideration of the Committee.

*Continental Roll & Steel Foundry Co., East Chicago, Ind.

Job Evaluation, Time Study Committee Offers Help

By F. E. Wartgow*, Chairman, Job Evaluation & Time Study Committee

THE Job Evaluation and Time Study Committee again is holding a session at the Third War Production Foundry Congress to discuss those subjects. It is the Committee's opinion that these control methods will be adopted more widely as time passes. As a result, the Committee's endeavors are of an educational character and it wishes to help and be of service to foundrymen as a whole. The Committee is willing to offer suggestions and help all those interested in these subjects and to make recommendations on sources of information.

Realizing that the Committee's activities are closely allied with those of some other general interest committees of the Association, plans are now under way to cooperate with those committees and to broaden the scope of activities of the present Job Evaluation and Time Study Committee.

*American Steel Foundries, Chicago, Ill.

Foreman Training Steps to Front

By W. G. Conner, Jr.,* Chairman, Foreman Training Committee.

THE Foreman Training Committee, during the past year, has spent most of its time preparing the program for the session at the Third Foundry War Production Congress. The program as outlined will be one of the best that the Foreman Training Committee has presented and should be one of the high lights of the convention this year.

The program will consist of five papers, all on different phases of the all-important subject, Foreman Training. The papers will be preprinted and sent out to the membership previous to the meeting in Buffalo. The authors are going to keep their particular subject before them constantly and accumulate any newer data that are available. Each speaker will summarize his paper, adding any new information obtained. This presentation will be followed by a 15-min. discussion period. The committee believes the complete recording of this session will make available to the membership some real valuable data on the subject, Foreman Training.

One of the papers to be given and discussed is the "Postwar Foreman." Naturally, of course, the postwar period is going to affect foremen more than any time in the history of our industry. We believe that those attending the meeting in Buffalo will have an ideal opportunity to discuss, informally, the postwar problems as they affect the foreman.

*Walworth Co., Washington Park, Ill.

Safety and Hygiene Committee Has New Code

By J. R. Allan,* Chairman, Industrial Hygiene Codes Committee.

WITH codes of industrial safety and hygiene being reviewed by the various boards and states throughout the country, the work of the Industrial Hygiene and Codes Committee has been actively continued during the past year. Forseeing the need for a code to cover industrial housekeeping and sanitation, the Committee, during the year, published a code of recommended practices to cover that subject. The new code is the seventh prepared by this Committee.

The other codes cover recommended practices for the testing and measuring of air flow in exhaust systems; grinding, polishing and buffing equipment sanitation; a handbook on fundamentals of design, construction, operation and maintenance of exhaust systems; metal cleaning sanitation; good safety practices for protection of foundry workers, and a war-time code, drafted at the request of the Office of Civilian Defense, covering recommended practices for the protection of life, property and production in

*International Harvester Co., Chicago, Ill.

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the foundry industry during the war.

During the year, information has been gathered concerning the hazards of magnesium and aluminum foundry operation, and the problem of fume and dust abatement in nonferrous foundries.

The Committee, of which the writer is Chairman, takes pride in the fact that its activities have become recognized nationwide, and that it is doing a job for the foundry industry which, thus far, stands head and shoulders above the efforts of other industries in the direction of the safety and protection of its personnel.

Trained Men Are Industry's Big Asset

By F. G. Sefing,* Chairman, Committee on Cooperation with Engineering Schools.

MEN of the foundry industry are in reality its biggest asset. Assisting in the training and education of these men, especially the foremen and minor executives, has been the work of the Committee on Cooperation with Engineering Schools in the past year.

The destinies of the foundry industry are obviously held in the hands of the directing personnel. The responsibilities of this personnel are largely engineering. Therefore, it is planned, through close association with the engineering schools of the country, to provide a source of young men trained in engineering and a source of scientific foundry information.

It is a further purpose of this committee to promote the advantages of young engineers in the foundry. This latter work is, of course, a long range viewpoint of special interest to foundry executives. The session on "Engineers in the Foundry" at the Third War Production Foundry Congress this year is especially arranged to appeal to those executives who are preparing to meet the ever increasing and exacting demands of industry by securing adequate personnel.

*International Nickel Co., Inc., New York.

Refractories Committee Is Making Real Contribution

By J. A. Bowers,* Chairman, Refractories Committee

REFRACTORIES Committee has been active again this year in gathering information, both practical and technical, for the benefit of all foundrymen. With accelerated production in the foundry, necessitated by war, better quality refractories and better methods of their use are continually being sought. The increased demand for steel castings for the armed services has caused many gray iron foundries to convert to steel manufacture. To meet these rapidly changing conditions, the committee members, both users and manufacturers, have been called upon for information and advice. The A.F.A., through this committee, as through the many others, has rendered a real service during the present emergency.

One of the papers at the 1943 convention gave valuable information on ways to obtain greater production by conserving refractories normally used for a given service. The other one illustrated clearly that increased production might also be gained in many instances by changing from one type of refractory to another.

When the 1944 A.F.A. convention is held we feel sure that the refractory session will again have papers that will render great assistance to foundrymen not only during the war but in the post-war period to follow.

*American Cast Iron Pipe Co., Birmingham, Alabama.

Apprentice Training Carries on During War

By J. G. Goldie,* Chairman, Apprentice Training Committee.

BECAUSE of the fact that the majority of men and boys eligible for apprentice training have entered, or rapidly are entering, the armed services, the activity of the Apprentice Training Committee during the past year has been somewhat limited. The Committee has staged the Annual Apprentice contest again this year, and judges have been appointed from the Western New York Chapter, hosts to the Third War Production Foundry Congress, to judge the castings. The Committee likewise has provided for a special session on war manpower devoted to post-war apprentice problems.

At present, the post-war period holds forth great promise for apprenticeship training. It is the writer's belief that during that period, apprentice training programs in the Foundry Industry will be greater than ever. The openings will far exceed those of any other trade, and chances of advancement will be greater.

The Apprentice Training Committee, in this present period, is just catching its breath from its strenuous previous activities, but is anticipating great activity when the present war has been victoriously concluded.

*Cleveland Trade School, Cleveland, Ohio.

Fig. 1—Examples of open headers (A-B).

Fig. 2—A—Method of choking runner bar to control metal flow.

HEADING AND GATING OF *Malleable* IRON CASTINGS

By A. J. KLIMEK,
Albion Malleable Iron Co., Albion, Mich.

New and changing conditions are constantly producing new problems that challenge the ingenuity of the malleable foundryman. This article shows some methods of heading and gating that solved some problems for one foundry.

THE subject of heading and gating is a very broad one presenting many angles and, in accepting it to be presented at this time, the author wishes to state that his remarks are based on his own experience and practice, together with his observation of the trend within the industry.

The art of gating and heading is to provide the casting or castings pattern with gates and headers, so arranged in the mold that the castings may be economically produced, free from such defects as might be attributed to gating practice. Arts are founded on practice; time makes for experience, and it is through experience and practice that we are able to form theories.

Theories, however, are like the proverbial pudding —the proof is in the eating. It seems that practically every job is a problem in itself, and that each individual plant has its own peculiar conditions, hence there are theories galore.

It would be difficult at this date to conceive of a method of gating and feeding malleable castings that might be described as original, and no such originality is claimed for any examples described herein. This paper deals primarily with the practice used at the plant where the author is employed. It is endeavored at all times to so rig, gate, and head as to be in line with modern production methods, consistent with the system in use.

Foundry Practice

The melting practice is duplex. Pouring is continuous for approximately 16 hr. a day. Several times during the day molds are poured simultaneously, with unit casting weights ranging from 0.10 to over 300 lb. (Figs. 4 and 5).

The system does not lend itself readily to favoring any particular mold with respect to pouring technique. The rule is to keep the sprue full. Care is exercised to gate in a manner that will provide, at least in reasonable measure, control of metal flow through the various channels and into the mold cavity. To this end, several methods are employed: (a) choking the runner bar (Figs.

Fig. 3—Example of gating and heading to avoid heat concentration.

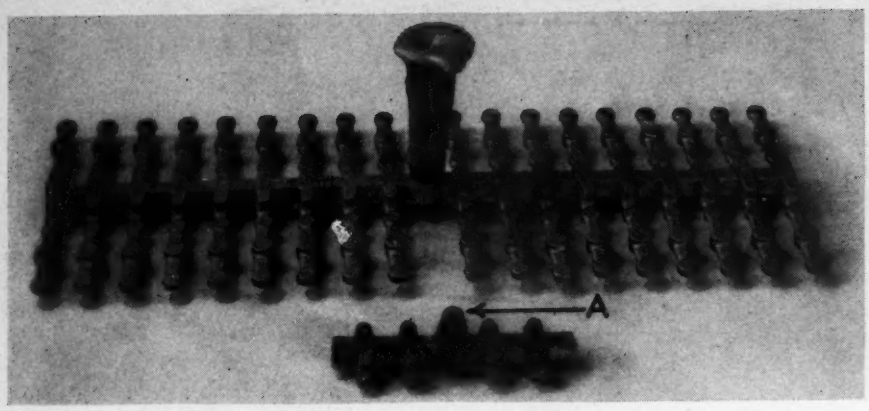


Fig. 4—Small malleable castings. Units range from 0.10 lb. A—Cone for locating sprue.

Fig. 5—Large malleable casting (300 lb.). A—Choked runner bars to control metal flow.

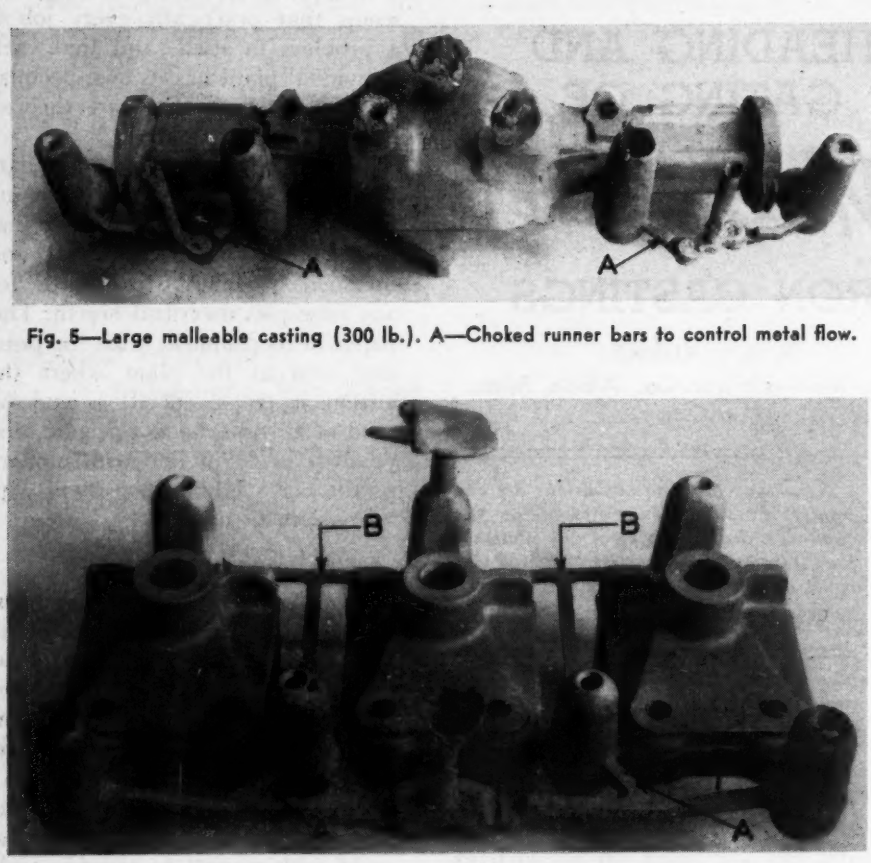


Fig. 6—A—By-passing inlet to header base nearest sprue to control metal flow. B—Tunnel cores and runners placed partly in cope and partly in drag.

5-A and 2-A) or (b) by-passing the inlet to the header base nearest to the sprue (Fig. 6-A).

Tunnel cores are sometimes used for the control of metal flow, and runners are placed partly in the cope and partly in the drag (Fig. 6-B). Metal flow, also, is controlled by reducing or increasing the neck joining the runner bar with the skimmer core pad (Fig 7-A-B).

Runner bars, as a general rule, are in the cope. However, if for some reason, the runner bar is in the drag, additional slag traps are provided (Fig. 8-A-B).

Sprues

The sprue cutters used on match plate jobs are not less than ¾-in. in diameter, and it is believed that a cone on the plate is helpful in correctly locating the sprue. This also eliminates the fin of sand usually found at the bottom of the sprue in the cope, caused by the sprue cutting operation, and the danger of this loose sand flowing with the stream of metal into the casting (Figs. 4-A and 7-C).

Strainer Cores

Gate or strainer cores have slotted rather than round openings (Fig. 9). Pouring directly on the slots is avoided if possible, particularly so whenever the metal per mold is of considerable amount.

Machine jobs of cope and drag type are provided with a permanent sprue post, the head only being removable.

Headers

Headers are of no particular size or shape (Fig. 10-A-B), these points being determined by what proves to be most practicable and efficient for the job in question. This is also true of base and neck.

It is preferred that the header be as close to the casting as molding practice will permit, the neck being as large as possible, consistent with the facilities for its removal in hard iron as well as minimum shearing and grinding in soft iron (Fig. 10-C). Mostly all headers are countersunk (Fig. 10-D), and sometimes ram-up cores are used, which seems to facilitate better working of the header. This is particularly so with blind heads or what are sometimes called back feeders.

Live headers are preferred, but instances have been found where the blind header proved more satisfactory for the particular job (Fig.

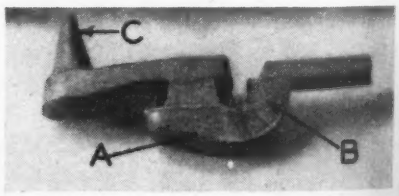


Fig. 7—Control of metal flow by reducing or increasing neck joining runner bar with skimmer core pad (A-B). C—Cone for locating sprue.

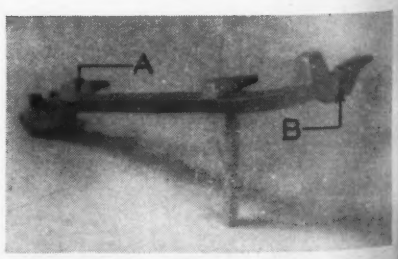


Fig. 8—Additional slag traps provided when runner bar is placed in drag (A-B).

Fig. 9—Slotted gate or strainer cores.

11-A). Open headers (Figs. 12-A-B and 1-A) are always covered with an anti-piping compound as soon as the iron comes to the top.

Chills

It is the practice to eliminate shrinkage by feeding rather than by chills. However, chills have their place, and they are used whenever circumstances warrant, but only as a last resort.

Heat Concentration

Gating and heading to avoid heat concentration is taken into account, but is not necessarily a rule. Heat concentration is always present in the region of the gate and header. The casting shown in Fig. 3 is a fair example of this fact.

The axle casting shown in Fig. 1 is of a little different design than the casting shown in Fig. 5, and is presented to bring out the fact that, although they are very similar, to achieve the same results a somewhat different gating and location of headers is required. In spite of the fact that the former casting weighs about 100 lb. more than the latter, the size of headers is practically the same, and quite a contrast as compared to the casting shown in Fig. 12.

Long levers and other castings of this type usually are gated, as shown in Fig. 14, with one gate to minimize tears caused by anchorage.

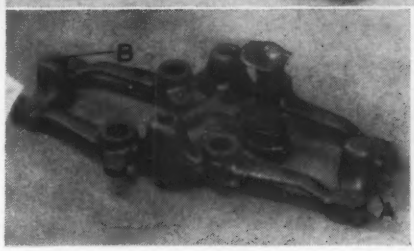


Fig. 10 (above)—Examples of size and shape of headers (A-B). Header placed close to casting (C). Countersunk head (D).

Fig. 11 (left)—Examples of blind headers (A-B).

Metal Turbulence

Various gating methods are employed to avoid turbulence and its resultant defects, such as slag, sand and gas holes. Figure 13-A is an illustration of a casting gated to avoid these defects. The iron first enters the mold cavity through the bottom gate and gradually builds up to the top or main gate, thereby eliminating turbulence.

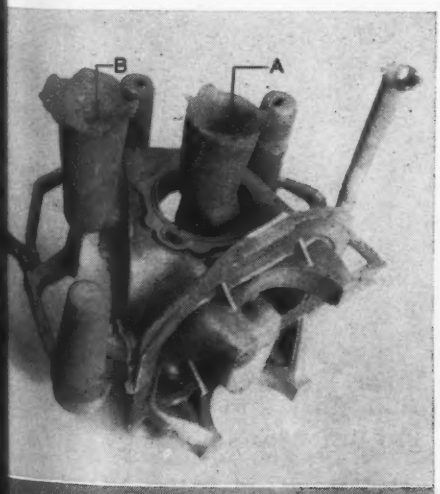
Castings of the hub type are found to be the most difficult to deal with. Shrinkage in the hub and checks in the periphery are both problems. It is the practice to feed the former and use chills or cracking strips in the latter.

The subject of heading and gating of malleable iron castings is one that, in the writer's opinion, will never be exhausted. New and changing conditions are constantly bringing forth new problems, so it will be a continuing challenge to the ingenuity and resourcefulness of the malleable foundryman.

Chemical Control Session a New Feature

FOR the first time, a session of an annual meeting of A.F.A. will be devoted exclusively to analytical methods for cast metals. With the advent of the spectrograph and the difficulties in securing materials for wet methods of analysis, this session should be of wide interest to those charged with the chemical control of foundry products.

Three papers will be offered at this session which is actually an experiment to determine interest in the subject. It will be held at 8:00 p.m., Wednesday, April 26.



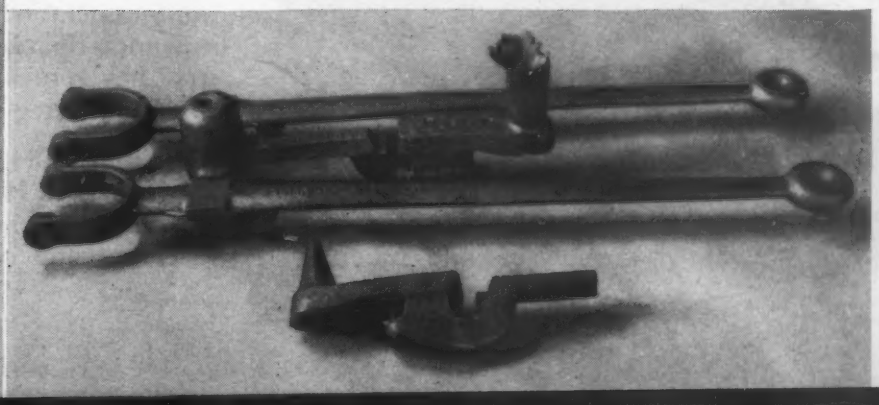


Fig 12 (left)—Examples of open headers (A-B).

Fig. 13 (lower left)—Example of casting gated to avoid turbulence in metal.

Fig. 14 (below)—Example of gating long castings to minimize tears.

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most ings of n in the presenting latest opments and refine- ments in production of cast metals. These events are free to Members.

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(February 16 to March 15, 1944)

Each month the tireless work of the Membership Committees is recorded in the American Foundryman, and a review of issues since the first of the year will show a steady increase in new members. Added to this are the three Chapters which joined A.F.A. during the past year—Texas, Rochester and the latest addition, the East-Central Ohio Chapter. This bigger, stronger Association makes for a brighter, more progressive future of the foundry industry as a whole, and the Membership Committees deserve a word of thanks for their splendid co-operation.

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Henryk Zimnawoda, Sao Paulo, Brazil.

Schedule of April Chapter Meetings

April 3
Central Indiana
Athenaeum, Indianapolis

✦

Metropolitan
ROUND TABLE MEETING
Gray Iron, Steel, Magnesium and Aluminum, Copper Base Alloys

✦ ✦

April 4
Chicago
Museum of Science and Industry

✦

Michiana
Hotel La Salle, South Bend
"Casting Defects"

✦ ✦

April 5
Rochester
University of Rochester
H. F. TAYLOR
Naval Research Laboratories, Washington
"Steel Castings"

✦ ✦

April 7
Western New York
Hotel Touraine, Buffalo
Meeting of 3d War Production Congress Local Committees

April 10
Cincinnati
Cincinnati Club, Cincinnati

✦

Western Michigan
Hotel Ferry, Grand Haven

✦ ✦

April 11
Northern Illinois & Southern Wisconsin
Hotel Faust, Rockford, Ill.

✦ ✦

April 13
Northeastern Ohio
Cleveland Club, Cleveland

✦

St. Louis
DeSoto Hotel, St. Louis

✦ ✦

April 14
Northern California
"Core Binders"

✦

Philadelphia
Engineers Club, Philadelphia
MAX KUNIANSKY
Lynchburg Foundry Co.
"The Future of the Gray Iron Industry"

✦

Southern California
Clark Hotel, Los Angeles

Wisconsin Chapter
Schroeder Hotel, Milwaukee

✦ ✦

April 17
Quad City
Hotel Ft. Armstrong, Rock Island, Ill.
DONALD J. REESE
W.P.B. and International Nickel Co.
"Cupola Practice"

✦ ✦

April 20
Detroit
Rockham Educational Memorial, Detroit

✦ ✦

April 21
Eastern Canada and Newfoundland
Mt. Royal Hotel, Montreal
A. E. CARTWRIGHT and C. C. BRISBOIS
Robt. Mitchell Co., Ltd.
"Gates and Risers"

✦ ✦

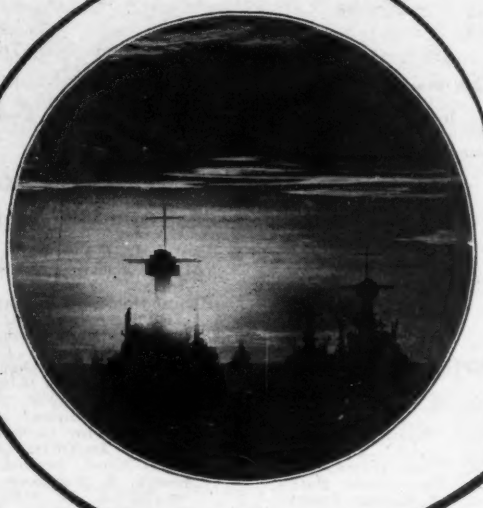
April 25
Toledo
Safety and Hygiene Night

✦ ✦

May Meetings

May 18
Texas
Golfcrest Country Club, Houston

Developing the Centrifugal Casting of NON-FERROUS METALS



By I. E. COX, National Bearing Corp., St. Louis, Mo.

A comprehensive review of problems relating to centrifugal casting of non-ferrous bearing metals, presented by the author and his co-workers as a contribution to the development of the centrifugal casting process. One of the interesting features of the paper, which was originally presented at the War Production Conference, January 14, 1944, in New York, is the research approach toward developing a mechanized method of centrifugal casting production.

CENTRIFUGAL casting of non-ferrous metal, in its present state of development, is rather an art than a science when we consider that art is the knowledge made efficient by skill, and science is the recorded and systematized application of that knowledge. The reduction of the art to the science is essential to the improvement and perpetuation to this process of casting, and this is especially true in the case of non-ferrous metals.

We find our foundries are fertile fields of unexplored art. Our melters, our molders, our coremakers and even our foundry laborers are the performers that the foundry research workers have to observe if their art is to be reduced to science. The secrets of these craftsmen are difficult to uncover.

The company, with which the author is associated, believes the centrifugal casting problem should be attacked on this basis. In the production of a casting, the art should first be reduced to a science and absolute systematized knowledge of the required details given to engineers, who can then develop equipment that will control such critical functions as time, temperature, and rate of change of temperature and other technical details to where they will no longer be subject to the discretionary judgment of any individual.

Inherently, the process will thus be mechanized as much as possible, thereby reducing labor required to a minimum. Quality will be improved and uniformly maintained.

Research Entails Equipment

To successfully carry on such research and engineering development for centrifugal casting, we had to acquire a full complement of laboratory apparatus and instrumentation, including precision temperature indicating and recording equipment, photo microscope and accessories, x-ray and the necessary apparatus for determining all required physical characteristics and a chemical laboratory for rapid and accurate quantitative determinations. Special machines had to be developed. Pilot models of the production units were laboratory built to save time.

We find we now need a small engineering department machine shop [illegible] representative machine tools of each class. [illegible] incomplete facilities necessitate extension of developmental programs, with results that are "too little and too late" to keep abreast of war impacted demands for new and better materials that competitors will provide if we do not.

Our first centrifugal casting problem involved a bearing lined with a babbitt which had to be centrifugally applied to secure the required bond and a dense sound lining. This metal was a calciated lead inhibited against corrosion by the necessary tin content. It had to be melted and poured in an atmosphere with no oxygen content.

Several of our most skilled babbitt handlers were drafted for research observation, and the bearings were processed using a lathe as a spinning machine where all functions were hand controlled. Pouring temperature, rate of pour, control of cooling rate after pouring, and methods of applying controlled atmosphere inside of the bearing to eliminate any oxygen content in the bearing bore during pouring operation were explored.

Design of Babbitting Unit

After all these details were studied, the babbitting unit for centrifugal casting of these bearings was designed as follows:

Raw natural gas was used as a neutral atmosphere under which the metal was melted in a covered pot designed for immersion heating. An elevator arrangement was provided to charge this melting pot, ingot at a time, without disturbing the oxygen-free atmosphere on the

A valve was provided in the bottom of the pot, operated by an air cylinder and controlled by a magnet valve. The valve opening was pre-set by a hand operated screw to control the rate of flow, and the amount of metal was controlled by a vacuum tube type electric timing relay which gave automatic control of the amount of metal and the rate of flow poured in each bearing.

This spinning machine was constructed similar to a lathe, having two spindles, one in the fixed head and one in a moving head mounted on a carriage. The fixed head was placed adjacent to the bottom pour pot to minimize the travel of the molten metal, and the spout of the bottom pour pot ran through a hollow spindle of this fixed head. The movable head, mounted on the carriage, was driven by a variable speed DC motor direct-connected and

supported on the carriage. The carriage movement was controlled by an air cylinder to clamp the bearing to be lined between the easily replaced adapters mounted on the spindles of the heads.

The cooling of the rotating bearing, after being filled with the proper amount of molten metal, was controlled by a timed exposure to a blast of aerated water vapor directed through a distributing head placed between the splindles. City water and a motor driven blower were used as the sources of air and water.

A raw gas line was provided through the spindle of the fixed head to purge the interior of the bearing of air by displacement with raw natural gas.

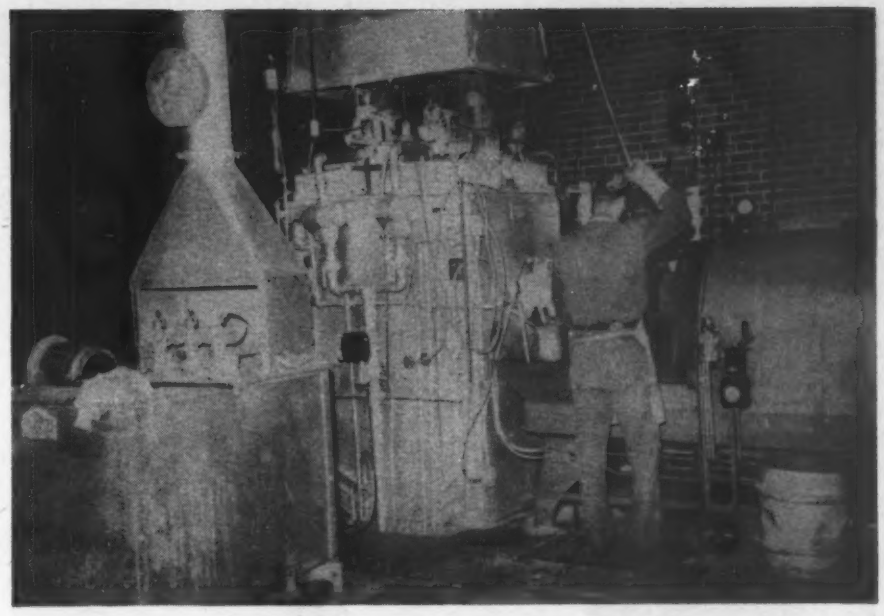


Fig. 1—Centrifugal babbitting unit.

Aircraft Specification Production

All compressed air, water and gas lines were controlled by magnet valves. A canopy cover, air cylinder operated with magnet valve control was arranged to automatically open and close at the proper time, as protection against the possibility of a hot metal leak during the pouring operation and to catch the cooling water so that it could be drained into a sewer.

It was also found necessary to put a ring gas burner around each of the two heads that contacted the bearing to heat them up after the completion of a chilling cycle for the reception of the next pre-heated bearing. These ring burners were provided with electric ignition and magnet valve control.

Protection was provided for the operator by a treadle switch, so arranged that when anybody was in front of the machine with the cover retracted, the electric ignition was shut off and the gas burners extinguished.

All of the functional operations of this machine were reduced for electrical control. By proper application of limit switches, timing relays, and electrical interlocks, automatic and instantaneous functional sequence was secured.

All an operator has to do is place a tinned, pre-heated bearing between the spindles, operate a valve to its running position and step on an instantaneous contact starter switch. The entire operation of purging, lining and cooling the bearing is then taken care of automatically.

When the cycle was completed and the machine brought to rest, the cover of the machine was automatically withdrawn ready for the removal of the lined bearing and the insertion of the next bearing to be processed.

It took approximately one year to build this machine, including development time. It requires only one man to operate it, as compared with four men for the unit it superseded. Production was increased 400 per cent per unit.

Our next centrifugal casting project was the development of equipment to produce a gun bronze cam bearing blank to an aircraft specification that required individual x-ray of each casting.

We were practically forced to cast this piece centrifugally due to the fact that the desired quality could not be produced statically cast in sand. Our Jersey City plant started work on this problem. Due to the fact that we had no engineering organization or laboratory equipment at Jersey City, it was more difficult to handle the job long-distance so the job was taken to St. Louis.

All published work on prior art was reviewed carefully, but was found confusing, necessitating some preliminary investigation of fundamentals. Both a horizontal and vertical spindle machine were set up for experimental purposes. The first problem was to find out what determined the proper axis of rotation for casting. We had to find what type of mold and what mold material was best suited.

On the heels of this problem, we had to find a mold wash. The exact pouring temperature had to be ascertained as well as the speed and power requirements.

We quickly found that the axis of rotation is a matter of convenience of getting the metal in the mold, and otherwise does not affect the casting, except that in long castings in the form of bushings cast with the spindle approaching a vertical axis, that excessive speeds were required to get the metal to climb and to prevent excessive taper in the bore.

Determining Power Requirements

After careful observation we arrived at the conclusion that higher quality could be secured by casting short bushings singly on a vertical spindle rather than in tub form.

For mold material we tried baked sand cores, then carbon and then gray iron. The chill effect of the gray iron mold produced the desired fine grain structure and physical qualities that were required for this piece. The carbon came second.

The sand cast by the centrifugal process was an improvement over static sand casting, but left a lot to be desired. An open grained molybdenum gray iron mold produced the best castings, withstood heat shock successfully and gave the

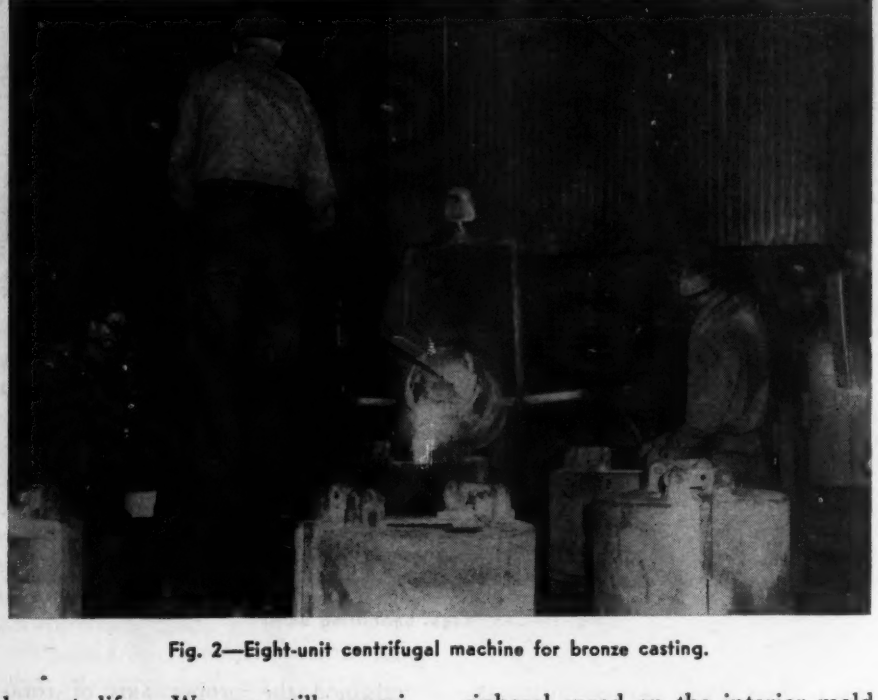


Fig. 2—Eight-unit centrifugal machine for bronze casting.

longest life. We are still experimenting with several types of iron.

The larger molds are subjected to the most severe conditions, and our experience indicates the experimental molds furnished by a brake shoe show promise of being most satisfactory.

Various mold washes were experimented with, which are necessary to prevent the molten bronze from burning in the mold surface, and to facilitate the removal of the casting from the chill mold.

Where rapid chilling is essential, a mixture of colloidal lead and graphite sprayed in the mold has proved very satisfactory. Where a slower chill rate can be tolerated, a mixture of bentonite and silica flour has worked out well.

Melting practice and pouring temperatures are far more critical for centrifugal chill casting than are commonly practiced in sand foundries. Here the services of the trained metallurgist are necessary to determine whether the flame shall be oxidizing or reducing, and to what degree, especially if crucible furnaces are used for melting.

This requires frequent Oerstad tests of the products of combustion from these furnaces to maintain proper burner adjustment. It is beyond the scope of the assigned subject to go into detail in this matter.

Spinning speeds were experimented with, and it was found that the best results could be produced from 1100 to 1300 ft. per min. peripheral speed on the interior mold wall surface.

In general practice, in centrifugal chill mold casting process on vertical spindles, the height of a mold was limited to its diameter. With these speeds no trouble was experienced in having the metal climb in the molds, and the taper does not exceed 3 or 4 degrees in a true bushing cast vertically.

For molds weighing up to 300 lb., we find that a 1 H.P. motor will provide sufficient power. From 300 lb. to 1,000 lb., we use a 5 H.P. motor. On one large machine, on which we install molds weighing up to 3,500 lb., we use a 20 H.P. motor.

Most of the motor capacity is used for acceleration and breaking, so the frequency of the pouring cycle really determines the H.P. requirements. The figures given are safe on the 1 H.P. unit for a 10 min. interval; on the 5 H.P. unit for a 30 min. interval; and on the 20 H.P. unit for an hourly interval.

Consideration of Motor

There is considerable difference of opinion as to the advisability of using a single speed motor and the number of machines for the number of spindle speeds required, as contrasted with the variable speed units driven by either a variable speed motor or a hydraulic drive.

If the work to be produced is in relatively short runs, and there is a large variety of type and size of castings produced, the variable speed unit is obviously the most economical. However, if the production contemplated is high, for each item produced, the constant speed standard motor drive is far less expensive in both first cost and maintenance.

It seems to me that this is just a matter of arithmetic, if you know what work you have scheduled to produce. The chill effect in the casting of this gun bronze cam ring was found to be a function of the thermal capacity of the mold and, as it worked out later for other alloys and mixtures, a mold wall thickness of approximately two and one-half times the wall thickness of the casting to be produced will provide the proper chill effect without unduly shortening mold life.

Temperature Maintenance

Mold temperature can be controlled by the number of molds in circulation that pass by a pouring station. Mold temperatures should be maintained between 350 and 400° F., according to our experience, to get best results.

After most of the essentials, above enumerated, had been properly evaluated, a centrifugal casting machine was designed, consisting of a vertical spindle, driven by a standard general purpose constant speed motor through a V belt drive on step pulleys to give semi-permanent adjustment of speed.

The 1 H.P. 300 lb. mold units were grouped, 8 on a merry-go-round, with a gravity conveyor arrangement to transport poured molds to mold cleaning stations, and to return cleaned molds for replacement on the spindles of the merry-go-round.

The bottom of the molds were provided with a babbitted fit to centrally locate them on the spindle driving plates for facile removal and replacement of molds on spindles.

From 3 to 5 mold cleaning stations are required for each merry-go-round unit. These are located between the conveyor line coming from the merry-go-round and the conveyor line returning to the merry-go-round. Each cleaning station consists of a motor driven spindle very similar to the individual casting machine units that are merry-go-round mounted.

It has been found in practice that there is required a pool of from 30 to 40 molds in circulation on one merry-go-round unit, if economical

operations are to be insured.

Furnace and pouring temperatures are taken and recorded on an indicating and recording potentiometer, wall mounted and wired to socket outlets at convenient locations. With this plug and socket arrangement, the tip immersion type thermocouples require only short flexible leads.

The indicating scale on the potentiometer can be read for a distance of 20 to 30 ft. The record roll on the potentiometer can be marked with the heat number so that the temperature of each heat becomes a matter of record. This arrangement has been found invaluable in the control of furnace and pouring temperatures.

It required approximately one year to develop and build a centrifugal casting production unit for this cam ring. It required another six months to stabilize the operation and develop the "know how" in a newly recruited operating crew. Soon, however, they became the operations that we observed in development work that followed.

On the heels of this cam ring job came the large diesel engine main and connecting rod bearings. For this application, high lead bronze castings were suddenly demanded to replace steel back bearings made of tubing, which had "gone to war."

We were asked to produce a bearing blank that could be processed with the same tooling as was previously used for steel tubing, requiring that after the casting was semi-finished it, being split in half bearings, formed in a die to a smaller radius so that each half could be used.

Other Centrifugal Casting Projects

Projections also had to be formed by pressure dies at the parting line of the bearing to form "tangs" to prevent the rotation and end movement of the bearing in the housing. Sand cast lead bronze would not stand this treatment, but the same metal centrifugally cast in chill molds worked out satisfactorily.

The development of centrifugally cast procedure for high lead bronze paralleled that of the gun bronze cam ring, so the cam ring procedure became the operation that was observed for determining lead bronze casting procedure.

Duplicate equipment was used for the production of the high lead bronze ring, with necessary changes in procedure of metal melting, pouring temperature, mold wash spray, etc.

Our last centrifugal project was aluminum and manganese bronze bushings and gear blanks. Again, parallel procedures to those used on other metals were developed, varying temperatures, chill rates, melting and pouring procedure as required.

In the case of the aluminum and manganese bronze, we had to go back to the sand foundry and draw on the experience of the molders to eliminate any turbulance of metal during the pouring operations, especially of aluminum bronze. While the equipment developed and the procedure itself is nothing like anything in the sand foundry, it operates exactly on the same fundamental principles found there.

Conclusion

As can be surmised from the foregoing details, our activities have been confined largely to centrifugal chill casting to date. In our superficial work so far in centrifugal casting in sand, our efforts have not been particularly successful, and we are very doubtful if the high lead bronzes can ever be successfully centrifugally cast in sand.

Other foundries have been very successful in using carbon molds for true alloys and staple mixtures of bronze, another field in which we have done very little work. It is our opinion, however, that centrifugal chill cast bronze in metal molds will produce finer grain structure and improve physical characteristics over that cast in either sand or carbon molds centrifugally cast in bronzes.

It is estimated that it will take at least another year to get this centrifugal chill casting process completely mechanized, a project which it is hoped will be carried on currently with further work in sand and carbon molds.

In conclusion, it is felt that a better job has been done, if this gives a plan of attack on problems relating to centrifugal casting of bronze, rather than specific details that may or may not apply to some particular job.

Heading and Gating Subject of Lectures

UNDER the direction of this year's Joseph S. Seaman Gold Medalist, W. G. Reichert, W. G. Reichert Engineering Co., Newark, N. J., the Annual Lecture Course will continue its discussion of gating and risering problems in the various branches of the castings industry.

In deference to the symposium on this same subject being staged by the Malleable Division, no session of the Lecture Course will be devoted to that subject. However, at the session on steel gating and heading methods, H. F. Taylor, Naval Research Laboratory, Washington, D. C., will act as discussion leader, while K. V. Wheeler, American Steel Castings Co., Newark, N. J., will act as chairman. A. McIntosh, Wright Aeronautical Corp., Patterson, N. J., will be chairman of the meeting which will discuss aluminum and magnesium heading and gating practice with R. E. Ward, Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., acting as discussion leader.

Gray iron practice will be discussed at a third session at which Max Kuniansky, Lynchberg Foundry Co., Lynchburg, Va., will preside, and W. W. Levi of the same company will act as discussion leader. On Friday morning, W. B. George, R. Lavin & Sons, Inc., Chicago, Ill., will discuss brass and bronze heading and gating methods with J. E. Crown, U. S. Navy Yard, Washington, D. C., presiding.

Gating and heading practices for all types of cast metals will come under consideration during the four days of the Congress.

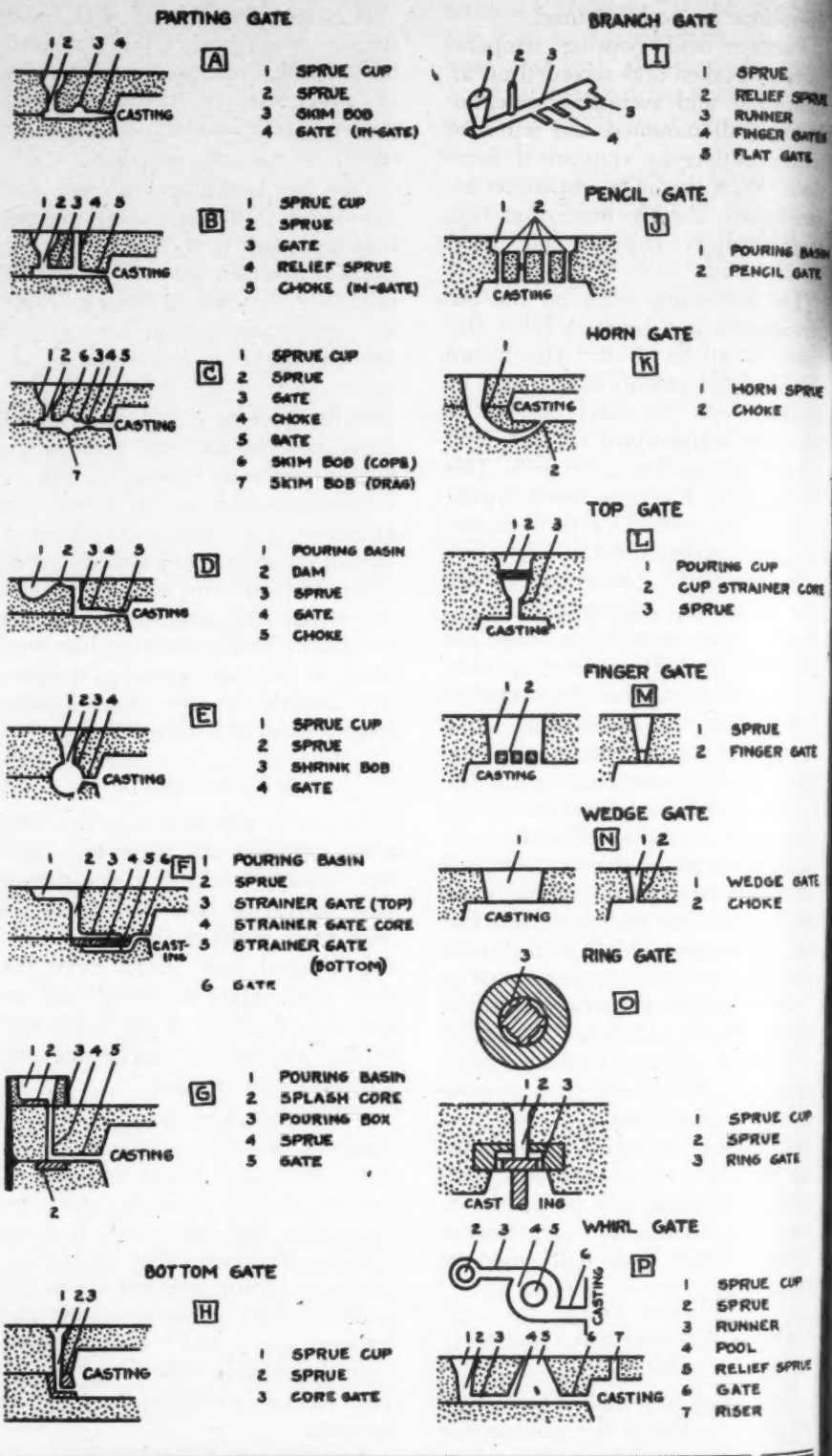
New Committee Members Appointed

DURING the past several weeks, the following have been appointed to various committees of the Association: E. A. Swensson, National Engineering Co., Chicago, Plant and Plant Equipment Committee; F. S. Berwster, Dow Chemical Co., Bay City, Mich., Executive Committee, Foundry Sand Research Project; C. E. Bales, Ironton Fire Brick Co., Ironton, Ohio, Chairman, Cupola Research Subcommittee on Refractories.

Gating Terms Defined

AT THE 1943 convention of A.F.A., the Subcommittee on Gating Terms, Committee on Nomenclature, presented a report covering a survey of the industry to determine definitions and descriptions of various methods of gating. From approximately 40 replies to a questionnaire submitted by the Subcommittee, sketches of various systems of gating were prepared and the preferred nomenclature referring to each system was indicated.

The terms indicated on the gating system shown in the accompanying illustration are those selected as being the most common in practice and also the most descriptive. The accompanying illustration is shown again for the purpose of bringing the approved nomenclature to the attention of foundrymen in the interests of securing, eventually, general acceptance of those terms.



Judges for National Apprentice Contest

HENRY C. WINTE, Worthington Pump & Machinery Corp., Buffalo, Chairman of the Western New York Chapter Committee on Arrangements for the Third War Production Foundry Congress, has announced the judges for the national apprentice contest, to be held in connection with the Congress. These men will judge the patterns and castings submitted by apprentices throughout the country in the four contests sponsored by the A.F.A. Apprentice Training Committee. The four contests are those in gray iron, steel, non-ferrous molding and patternmaking. The list of judges is as follows:

Gray Iron

Emil A. Piper, Pohlman Foundry Co., Buffalo.

T. O'Brien, Clark Bros., Inc., Olean, N. Y.

Frank McQuillin, Standard Buffalo Foundry, Inc., Buffalo.

John Goetz, Acme Steel & Malleable Iron Works, Buffalo.

A. Amann, Acme Steel & Malleable Iron Works, Buffalo.

John Zenus, Jewell Alloy & Malleable Co., Inc., Buffalo.

Steel

Arthur H. Suchow, Symington Gould Co., Depew, N. J.

Joseph Clifford, Bison Castings, Inc., Buffalo.

James Begley, Pratt & Letchworth Co., Inc., Buffalo.

Alternate—Alfred Diebold, Atlas Steel Casting Co., Buffalo.

Non-Ferrous

Harold R. King, Metal & Alloy Specialties Co., Inc., Buffalo.

Joseph Mayer, Lumen Bearing Co., Buffalo.

Clyde E. Weir, McCallum-Hatch Bronze Co., Inc., Buffalo.

Alternate—R. MacVitte, American Magnesium Co., Buffalo.

Patternmaking

Harry G. Ekdahl, Economy Pattern Works, Buffalo.

Fred G. Hendler, Aero Pattern Works, Buffalo.

John Franks, Worthington Pump & Machinery Corp., Buffalo.

Erwin W. Deutschlander, Worthington Pump & Machinery Corp., Buffalo.

Frank McQuillin, Standard Buffalo Foundry Co., Buffalo.

Battery of aluminum melting furnaces *(Courtesy Caterpillar Tractor Co., Peoria, Ill.).*

Pouring aluminum cylinder head castings *(Courtesy Caterpillar Tractor Co., Peoria, Ill.).*

American Practice for Degassing of Aluminum Alloys

By R. E. WARD, Eclipse-Pioneer, Teterboro, N. J.

This summary of three of the most commonly used American practices for degassing aluminum alloys brings out the salient features of the double melt process, gas fluxing, and salt fluxing.

INTEREST in the subject of degassing aluminum alloys has increased markedly in the past few years, due to over-all consistently higher quality requirements of aluminum products arising from the ever-increasing use of aluminum products for war applications.

Therefore, it is important that the utmost control be used in the production of aluminum alloy castings, particularly with the rigid requirements of many war products. With sufficient care being exercised, it is possible to overcome some of the difficulties which have arisen because of the necessity to utilize all available material, some of which is not as clean as that to which the foundryman had become accustomed in the past.

There are several methods of securing relatively gas-free castings. The first and by far the best method is to prevent the gases from entering the molten alloy. Where added precautions are necessary to completely minimize gas in the molten metal, there are three commonly used methods for degassing aluminum alloys, which may be used singly or in combination:

1. Freezing the melt and reheating before casting (double melt process).
2. Gas Fluxing.
3. Salt Fluxing.

It is desirable, on melting aluminum alloys, to retain a heel of molten metal from the previous heat. The ingots then may drop below the surface of this molten heel, and minimize the possibility of gas absorption during the melting period.

Minimum Exposure Desirable

If no molten metal is available, large pieces should be melted first and the smaller pieces dropped into the molten heel thus formed. In this way, the smallest possible contact area will be exposed to the atmosphere during the heating cycle.

Absolutely dry material should be charged into the furnace. This same precaution should be observed with regard to all furnace tools coming into contact with the molten metal. A cover of flux will also assist in minimizing gas absorption.

Furnace Design Important

Furnaces should be so designed that the combustion gases do not come in direct contact with the metal. The heat should be equally distributed around the pot and it is desirable to have several small burners rather than one large burner.

The highest temperature reached by the molten metal should be kept to a minimum since, as the temperature increases, the solubility of gases in the molten metal increases. Further, the resultant grain size in the casting is a function of the maximum temperature reached during melting.

In the first method of degassing,

(Continued on Page 63)

Aluminum alloy castings have proved a major factor in the success of America's plane production program.

3 NEW A.F.A. Publications

A.F.A. Code of Recommended Practices for Industrial Housekeeping & Sanitation

This is the 7th and latest code of recommended practices for foundry safety and hygiene, prepared by the A.F.A. Industrial Hygiene Codes Committee. Just published, it covers the necessary engineering data and requirements for housekeeping and sanitation . . . wash room, locker room, rest room, toilet and lunch room facilities for all types of foundries. Includes important considerations for today's plants, especially where both men and women are employed. 14 pages, pamphlet form.

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Magnesium Foundry Practice

A new Symposium on Magnesium Foundry Practice, the first complete booklet of general information on this important metal ever published. Includes, under one cover, all papers and discussions on magnesium founding presented at the 1943 Foundry Congress, plus certain selected papers of value. A MUST for the magnesium founder. 148 pages, 6x9 booklet, 45 illustrations, 17 tables.

$1.50 to MEMBERS

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Symposium on Malleable Iron Melting

Second of the symposiums published under the direction of A.F.A. Malleable Division. The first symposium (1942) covered Graphitization of White Cast Iron. The present book covers all phases of malleable melting practice, including all papers and discussions presented in the important symposium at the 1943 Foundry Congress, plus selected papers. A wealth of valuable, up-to-date information. 243 pages, 6x9 booklet, 57 illustrations, 32 tables.

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(Continued from Page 61)

known as the double melting process, the alloy is heated until completely molten and then permitted to cool until completely solid, then remelted and cast. The gas which has been picked up during melting and alloying will be given off during solidification.

Uniform Initial Heat

In this manner, the melt may be heated sufficiently high to assure uniformity in the initial heating and alloying operation without danger of gas absorption during the final heating and casting operation, where the metal is raised only to the pouring temperature.

Gas fluxing is the term used for the introduction of either chlorine or nitrogen into the molten alloy to remove harmful gases such as hydrogen. The fluxing gas is introduced into the molten metal by passing it through a silica or carbon tube perforated at the lower end, which reaches almost to the bottom of the pot.

The gas is allowed to bubble up through the metal. The metal should be gas fluxed for a period of from 5 to 10 min. per 100 lb. of metal, and the temperature during fluxing should range from 1250 to 1350° F., although some authorities recommend temperatures of 1200 to 1220° F. for the fluxing of certain alloys.

If chlorine is used as a fluxing agent, it is desirable to provide adequate ventilation for the fluxing operation to remove the noxious chlorine fumes. It should also be remembered that any water introduced to the melt will form hydrogen. Therefore, it is important to assure the use of dry chlorine or nitrogen for fluxing, and also to thoroughly dry the tubes used to introduce the fluxing gas.

Use of Salt Fluxes

A third procedure for degassing aluminum alloys is the use of salt fluxes, such as aluminum chloride, zinc chloride, soldium silica fluoride or any of several proprietary fluxes. These fluxes are sprinkled on the bottom of the pot before charging the metal.

The dross is skimmed from the surface after the metal has become molten, then a second application of flux is introduced at the bottom of the metal. The dross is skimmed off again just before pouring. Again, it is essential that these fluxes be kept absolutely dry in order to minimize the danger of moisture from coming into contact with the molten bath.

Since aluminum and its alloys pick up gas so readily, it is important that the molten metal be prevented from absorbing gas after the degassing operations. There are many factors which influence the gas pick-up of aluminum alloys, among which are the atmosphere and the amount of water vapor therein, the products of combustion, and damp stirring rods.

Avoid Agitation

The melt should not be agitated unnecessarily, and care should be taken in pouring to keep the stream of molten metal as short as possible in order to expose the metal to the air as little as possible.

As previously mentioned, it should also be remembered at all times that gas absorption is directly proportional to the temperature of the melt. Therefore, it is essential that melting and holding temperature be kept at the lowest practical points. To further minimize gassing of molten metal, it is good practice to minimize the holding time prior to casting.

Two Sessions Discuss Centrifugal Casting

AT the suggestion of the Technical Activities Correlation Committee of your Association, a Symposium on Centrifugal Casting has been arranged for the Third War Production Foundry Congress. The Symposium will consist of two sessions, one to be staged at 4:00 p.m. Thursday, April 27, which will be devoted primarily to centrifugal casting methods for non-ferrous alloys. At this session W. W. Edens, Ampco Metal, Inc., Milwaukee, Wis., will discuss "Beneficial Effects of Centrifugal Casting upon Heavy Non-Ferrous Alloys," while J. B. Weber of the same company will discuss "Calculations and Devices Involved in the Operation of Small Centrifugal Casting Machines." "Centrifugal Casting of Non-Ferrous Metals" will be discussed by I. J. Cox, National Bearing Metals Co., St. Louis, Mo. Of especial interest in this session should be the paper by Robert Neiman, Whip-Mix Corp., Louisville, Ky., who will discuss "Accurate Casting by the Investment Molding Process."

The second session of the Symposium will be held on Friday, April 28, at 4:00 p.m., and will be devoted to both steel and iron centrifugal casting problems. Peter Blackwood and John Perkins, Ford Motor Co. of Canada Ltd., Windsor, Ontario, will present "Centrifugal Castings" in a paper discussing the application of that process to steel, while C. K. Donoho, American Cast Iron Pipe Co., Birmingham, Ala., will discuss "Centrifugal Casting of Steel."

Of interest to all foundrymen who are interested in the centrifugal casting process should be the paper by F. G. Carrington, Lynchburg Foundry Co., Lynchburg, Va., on "Effect of Spinning Speeds on Centrifugal Castings." Those who are interested in the centrifugal casting process will find the sessions of the symposium of great interest in that they will contribute knowledge to that already available on the subject.

Canadian Members to Hold Luncheon

A.F.A. members who reside in Canada, will gather at a luncheon to be held on Wednesday, April 26 at 12:30 p.m., Hotel Statler. Definite location of the luncheon will be shown in the official program of the Third War Production Foundry Congress which those attending the Congress will receive when they register at the Buffalo Memorial Auditorium.

A committee of Canadian foundrymen, consisting of members of both the Toronto and Eastern Canada and Newfoundland Chapters, is planning a short program for the luncheon, the primary function of which is to promote acquaintanceship among Canadian members of A.F.A.

Members who reside in Canada are asked to cooperate with the Committee so that it may supply to the National Office of your Association an estimate of the attendance at this luncheon. It is necessary that these figures be made available so that proper plans can be made for feeding the required number of people and that no one will be turned away because of lack of facilities.

Making and Heat Treating an Air Hardening Steel

By GORDON W. JOHNSON
American Hoist & Derrick Co.,
St. Paul, Minn.

The accompanying article describes a method of cleaning, machining and heat treating air-hardening steel castings, which meets the requirements of low distortion, hardening throughout, and freedom from strains and cracking.

STEEL castings must be hardened and ground, with a minimum amount of distortion, present a difficult problem to both the foundryman and the heat treater. Especially troublesome are those castings of unsymmetrical design with heavy and light sections immediately adjoining, and with machined spur or bevel gear teeth which must hold dimensions during heat treatment.

The problem is further aggravated when, as an additional requirement, high strength, and thus high hardness, is required throughout the casting. This eliminates the possible use of an alloy carburizing grade which might prove satisfactory if surface hardness were the only requirement.

The use of medium-alloy oil-hardening grades is only partially successful. The hardenability of this type of steel is sufficient to give satisfactory depth of hardness, and in conservative designs, where variations in section are not excessive, distortion and quenching cracks can be held to a low level. However, in castings of more radical design an oil quench frequently has been found to be impractical even with the use of quenching fixtures.

Thus, a high alloy air-hardening steel is indicated when the requirements of low distortion, hardening throughout, and freedom from strains and cracking are to be met. A chromium - nickel - molybdenum grade, having the following representative analysis, has been found satisfactory:

Carbon	0.55 per cent
Manganese	0.70 per cent
Chromium	0.75 per cent
Nickel	1.50 per cent
Molybdenum	0.50 per cent

Silicon is held at about 0.40 per cent with sulphur and phosphorus below 0.04 per cent and 0.05 per cent, respectively.

Melting and Alloying

In the foundry with which the author is connected, the melting unit used in preparing the steel is a two-ton side-blown Tropenas converter, charged from a standard 48-in. cupola. The steel is poured directly from the converter; that is, it is not triplexed.

Nickel and molybdenum are added to the converter before blowing, since loss through oxidation of these two alloys is slight. Chromium is added to the converter at the end of the blow. In order to insure its passage through the slag, chromium is added in the molten state in the form of an exothermic alloy addition to the recarburized metal from the cupola.

Cooling the Casting

Because of the air-hardening characteristics of this steel, castings poured from it are never shaken out hot from the mold but are allowed to cool slowly in the sand to prevent cracking. Even when observing this practice, self-hardening of all but the heaviest castings occurs to such an extent that chipping and cleaning are difficult and are best postponed until after the softening anneal, which is described later.

Stress Relieving

A preliminary stress relieving normalizing treatment is generally given the castings before cutting off gates and risers with the oxy-acetylene torch. This treatment serves to prevent rupture resulting from internal strains.

Pre-heating to 400-500° F. is useful in preventing the formation of surface checks during cutting. Such surface cracks become a serious problem when they extend below the depth of metal allowed for machining, and often occur unless proper precautions are observed.

Heat treating steel castings to bring out the most favorable properties.

Grinding

No heavy grinding of torched surfaces is allowed, since this tends to increase the number and depth of cracks. The manganese content of the steel has a marked influence on its susceptibility to surface checking. Best results are obtained when the manganese content is held below 1.00 per cent.

Welding

Minor surface defects are arc welded, preferably with an alloy steel rod of comparable analysis. A suitable pre-heat, around 600-800° F., is essential.

Annealing

The most favorable properties of machinability are developed by a carefully controlled spherodizing anneal. This treatment consists of holding the castings at 1600° F. for a suitable length of time, depending upon maximum section thickness, immediately followed by prolonged heating at 1250° F.

The holding time at 1250° F. will vary between six and ten hours depending upon the size of casting and its analysis range. The aim of the anneal is to reduce hardness to around 225 Brinell, at which hardness the most favorable machinability is obtained.

The use of a circulating-air, cyclone-type furnace for the 1250° F. heat insures uniformity of hardness and machinability throughout the load. Such uniformity could be maintained only with difficulty in a still air furnace operated at this temperature, especially if the furnace were loaded to any appreciable depth.

Machining

Following the anneal, normal machining operations, such as roughing, boring, drilling and tapping, gear cutting, etc., are carried out at normal cutting speeds using standard high-speed or carbide tools. In the case of cut gears or other parts having finished bores whose dimensions must be held to tolerances of .001-in. or less after hardening, a few thousandths excess metal is left in the bore during the first machining operation and then the part is re-bored or ground to final dimensions after hardening.

Table 1

PHYSICAL PROPERTIES OF AIR HARDENED STEEL

Brinell Hardness	*Tensile Strength, psi.*	*Yield Point, psi.*	*Elongation, per cent*	*Reduction of Area, per cent*
418	196,000	154,000	8	15
364	169,000	138,000	13	20
321	151,000	127,000	15	24
286	133,000	108,000	18	28

Air Hardening

The hardening process consists simply of an air quench from 1650° F., either in still air or in a mild blast, followed by an appropriate draw treatment between 900° F. and 1100° F., depending upon the hardness desired.

Care should be taken that castings having variable sections are soaked sufficiently long at quenching heat to insure even temperature throughout. The old "hour per inch" rule is a good one to follow.

By following the above practice, maximum hardnesses of 400 to 450 Brinell are obtained in sections up to 6-in. using a 900° F. draw. Lower hardnesses between 300 and 400 Brinell are obtained by adjusting the draw temperature between 1000° F. and 1100° F.

These higher tempering temperatures are made possible by the presence of the high molybdenum content. The required holding time at tempering temperature is also greater than for steels of lower molybdenum analysis. A minimum of 5 hr. for castings of 3- to 4-in. section and on up to 8 hr. for those of 6-in. section is used.

Some average physical properties of test bars air quenched and tempered to various hardnesses are listed in Table 1. The values were obtained from standard 0.505-in. test bars air quenched at a cooling rate corresponding to that obtained in a 4-in. section cooling in still air at room temperature.

New By-Laws Are Approved By A.F.A. Membership

ON February 15, at the direction of the Board of Directors, and in accordance with Article XX of the present By-Laws, a revised set of By-Laws was submitted to each member in good standing of the American Foundrymen's Association. Members were asked to cast their ballots for or against the adoption of these new By-Laws. In accordance with Article XX of the present By-Laws, all ballots were required to be cast 30 days following their submission to the membership.

Accordingly, all ballots received on or before March 15 were assembled, and a committee appointed by President Wilson met on March 18 in the offices of your Association to count the ballots and render a report. The Committee was composed of G. K. Dreher, Ampco Metal, Inc., Milwaukee, Wis., Chairman, Wisconsin Chapter; J. E. Drain, Oliver Farm Equipment Co., South Bend, Ind., Michiana Chapter Chairman; and John W. Porter, American Steel Foundries, East Chicago, Ind., a director of the Chicago Chapter.

According to the report of this Committee, which has already been submitted to President Wilson, 1210 ballots were cast. Of this number, 1191 favored adoption of the new By-Laws, with 12 voting in the negative. Six ballots were marked not voting, and one was unidentified. In view of this count, the Committee has reported to President Wilson that, having proceeded in accordance with the present By-Laws, the new By-Laws submitted to the membership on February 15 have been approved. In accordance with the action of the Board of Directors, the new By-Laws will become effective on July 1, 1944.

American Foundryman is *your* magazine. You can help in publishing it by supplying National Headquarters at 222 West Adams St., Chicago, with good action pictures of foundry operations.

A Study of Molding Methods for Production of SOUND CASTINGS

By F. G. Sefing, International Nickel Co., Inc., New York

Following several years' experience making castings sound, the author has laid down the principles involved. These fundamentals follow scientific principles and yet they are practical. No case has yet come to the author's attention where these principles have not worked successfully when applied to steel or cast iron, the bronzes or light metals. It will be noted that there is nothing complicated in applying the best molding methods for sound castings.

THE most important feature of any casting is that it be sound. Freedom from casting defects is really as important to the user as the particular composition of metal desired. Indeed, sound castings not only satisfy the customer, but they also insure profit for the foundry and assure repeat business.

Castings free from defects are dependable in service, cost the least to machine and to fabricate into machines, and can command the highest prices for the foundry. That foundry which makes the highest percentage of sound castings has the highest percentage of profit.

To produce sound castings, the greatest attention should be given to the molding details. It is economical and shrewd business to spend money to study those molding methods which make good castings.

The factors involved in molding satisfactory castings are the same for all metals. Let us consider what these factors are and how easily and sensibly they can be applied.

Gate Design

Clean metal poured into the mold cavity is of first importance. To this end the use of skim gates, slag traps or swirl gates are effective. In low melting point metals, such as aluminum, the use of coarse steel wool or perforated steel sheet as a skimmer over the sprue is effective.

In aluminum and magnesium pouring, agitation causes the trapping of some of the surface scum. This is prevented by using slotted sprues. The thin, deep slots and the angle of the pouring gates permit the metal to enter the mold with minimum agitation (Fig. 15).

The cross section of gates should be rectangular rather than square or round where they are attached to the casting, except when they are part of the feeding system. The rather thin rectangular gate section promotes more rapid freezing and, therefore, produces soundness at the gate.

The total area of the gates should be sufficient to have the maximum pouring speed without washing the sand. Filling the mold with hot metal, which also means rapid pouring, promotes soundness by giving time for removal of slag and gas inclusions.

Position of Gates and Risers

Controlled directional solidification is not peculiar only to steel foundry practice, where Briggs, Gezelius,[1] and others did the early work, but it should be applied wherever molten metal is freezing. The earliest application of this principle was in making sound steel ingots. By comparing big-end-down, big-end-up and hot-top ingots, it is seen how sound ingots have been controlled in the steel mill (Fig. 16).

The principle involved in controlled directional solidification is based upon the facts that the coldest metal and the smallest sections freeze first, and the direction of freezing shall move toward the heaviest sections and/or the hottest metal in the mold.

Furthermore, there shall be no intermediate light sections or cold

Fig. 1—Unsoundness in bronze castings caused by improper application of risers. Metal bracketed by angle is a blind riser. These risers caused shrinkage under them. The gates enter a thin section opposite a heavier section (arrows).

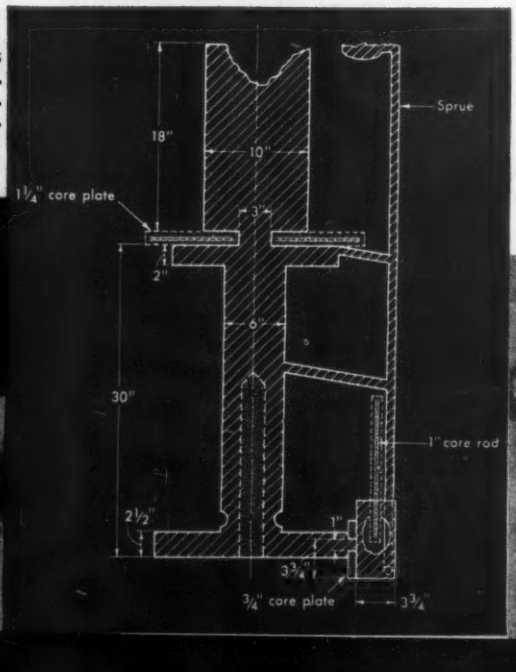


Fig. 2—Mold showing relative dimensions of risers and riser connections and atmospheric risers. Casting involved step gates, Williams risers, gating through the riser and knock-off risers. Reader should trace the freezing from the thinnest sections and coldest metal to heaviest section and hottest metal in the risers.

Fig. 3—Same castings as shown in Fig. 1. Note that the castings were turned so in order to gate through the heavy boss, eliminating the need of risers, with excellent results.

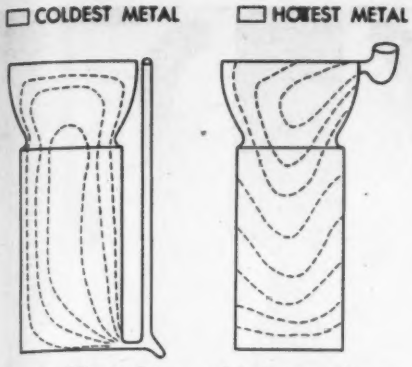


Fig. 4—Effect of top and bottom gating on temperature differential. Position of ingate controls the position of the cold and hot metal in the mold cavity.

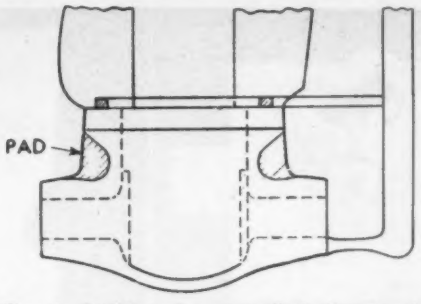


Fig. 5—Padding for controlled directional solidification. Use of pad to provide progressive freezing from the thin to the heaviest section.

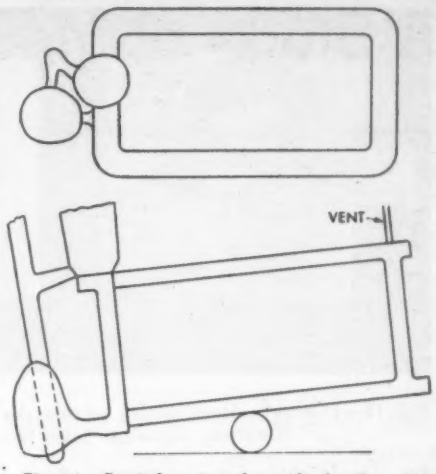


Fig. 6—Partial reversal method of gating and risering. Mold is tilted after pouring to provide hydrostatic pressure.

Some of the PRINCIPLES of GOOD HEADING and GATING DESIGN

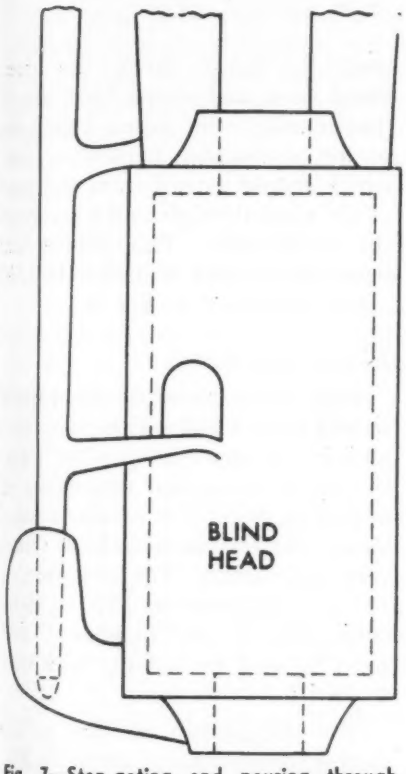


Fig. 7—Step-gating and pouring through risers. These gates permit the first metal to remain at the bottom, the next at the center, and final into the casting's top.

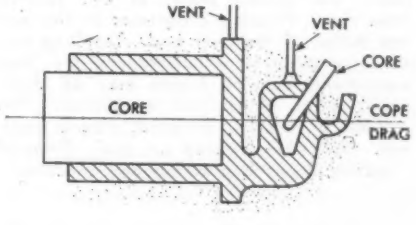


Fig. 9—Atmospheric pressure feeding, illustrating the principle of the Williams atmospheric riser.

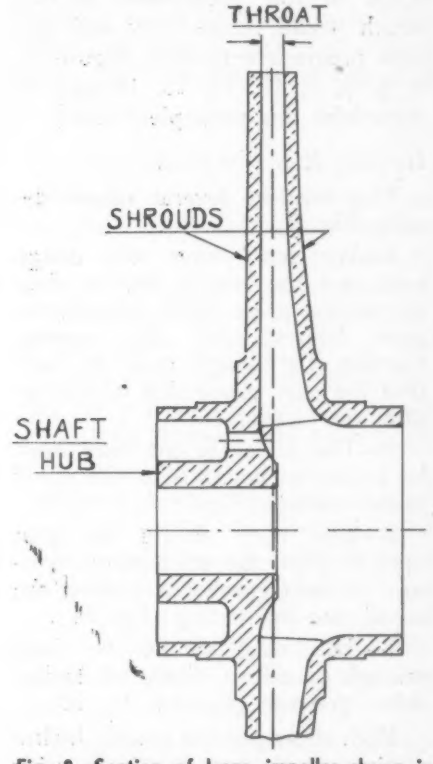
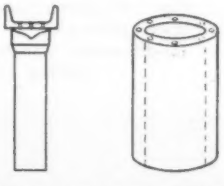
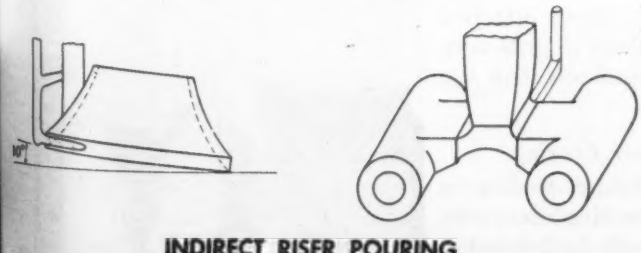


Fig. 8—Section of large impeller shown in Fig. 21. Metal poured with the axis horizontal through riser attached to the hub, poured rapidly and freely vented with rectangular vents at the top of both shrouds.



DIRECT RISER POURING



INDIRECT RISER POURING

Fig. 10—Examples of gating to provide the hottest metal in the best position for feeding.

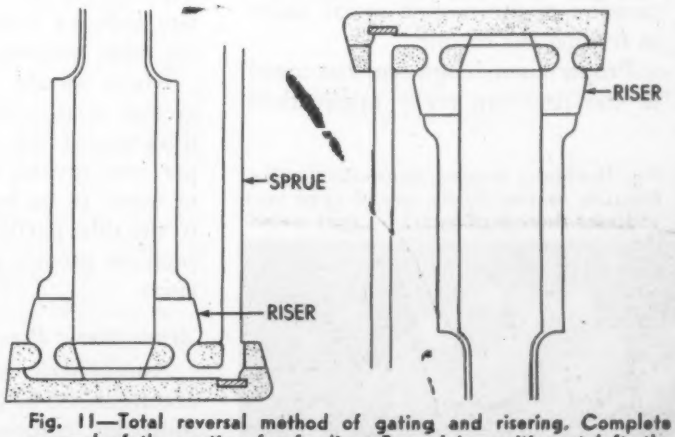


Fig. 11—Total reversal method of gating and risering. Complete reversal of the casting for feeding. Poured in position at left, the mold is reversed after freezing the sprue so that the hot riser can feed the casting by gravity.

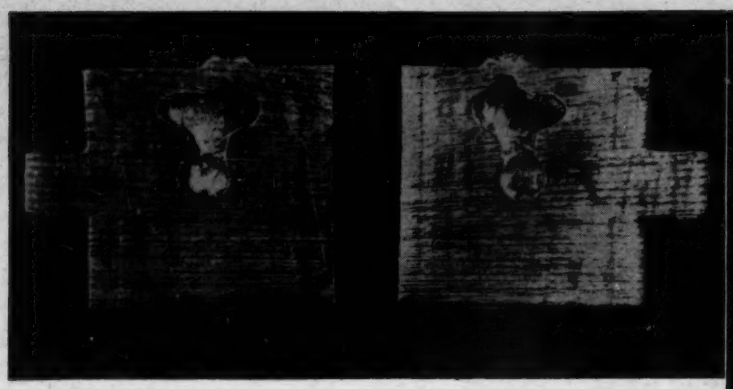


Fig. 12—(Above)—Steel casting section showing shrinkage cavity. (Courtesy, American Steel Foundries).

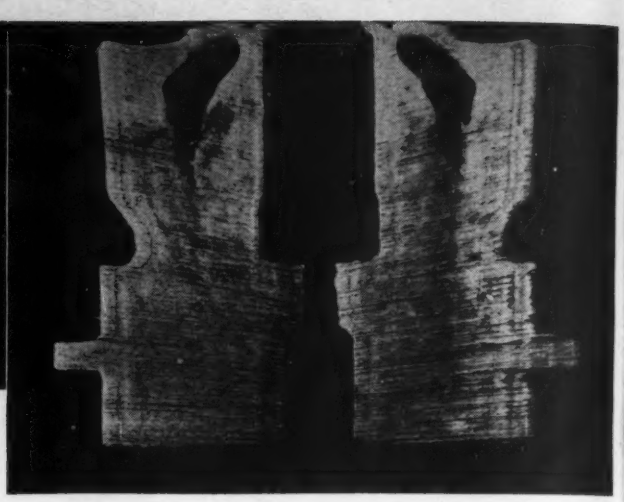


Fig. 13—(Right)—Same casting as shown in Fig. 12. Soundness insured by use of adequate riser.

metal in this progressive freezing which would freeze early and prevent progressive feeding. Figures 1, 3, 4, 5, 7, 10, 12, 13, 14 and 17 show how this principle is used.

Helping Risers to Feed

This involves several simple details (Fig. 2).

1—We must have the design such that the riser is heavier than the section to be fed to be sure the riser freezes after the casting. Further, the design must be such that the riser connection will freeze after the casting.

2—The metal in the riser must be as hot or hotter than the metal in the castings (Figs. 4, 5, 7, 10, 13).

3—The riser should be kept open to allow the atmospheric pressure to assist gravity in pushing the metal into the casting (Fig. 14).

4—The riser should be high enough to afford plenty of hydrostatic pressure (Figs. 6, 11, 18).

High risers provide greater hydrostatic pressure to assist in securing soundness by pushing gas, slag, etc., up through the liquid metal and out of the casting. This same liquid pressure of the molten metal assists in feeding the casting.

Proper riser design and hot metal in the riser are really applications of the principle of controlled directional solidification.

To have risers contain the hottest metal in the mold, the metal should be poured by gating through the riser. When this cannot be done, hop-topping the riser with an auxiliary ladle of metal will accomplish the same purpose.

Fig. 14—Bronze casting gated through the riser. The coldest metal at end farthest from riser. Freezing progresses to the hottest metal at the riser end. The long runner was used to accommodate the flask equipment, but the length may be shortened. Horn enters riser at bottom. This method of pouring produces cleaner castings than when poured on end. Type of gating shown is practical and effective.

Risers should have 50 per cent greater cross section or, simply the thickness of the riser should be 50 per cent greater than the thickness of metal to be fed. Risers attached to the side, particularly in gray iron, promote greater soundness than top risers.

Atmospheric Pressure Feeding

Atmospheric pressure feeding is accomplished by covering risers with insulating compounds to prevent a skin of metal freezing over the top, and thus permit the atmosphere to push the metal down the riser. Blind risers and shrink bobs are of questionable value unless kept open to the atmosphere with core rods, which should extend from the sand of the mold through to the center of the blind riser. This device was patented by John Williams[3] in 1940 and is illustrated in Fig. 9.

Riser Connections

Riser connections to the casting should have a reduced cross section and be as short as possible (Fig. 2). Riser connection dimensions of not more than 1/3 of the casting section dimensions have been found very satisfactory. For example, a 1½-in. diameter or 1½ x 1½-in. connection is the maximum that need be used for a 6-in. thick riser to feed a 4-in. section.

The relationship of riser to the casting dimensions is given in Fig. 2. Note that the riser extends below the connection by the same

Fig. 16—Sound steel ingot production follows principle of controlled directional solidification. Ingot at right was kept molten with "hot top."

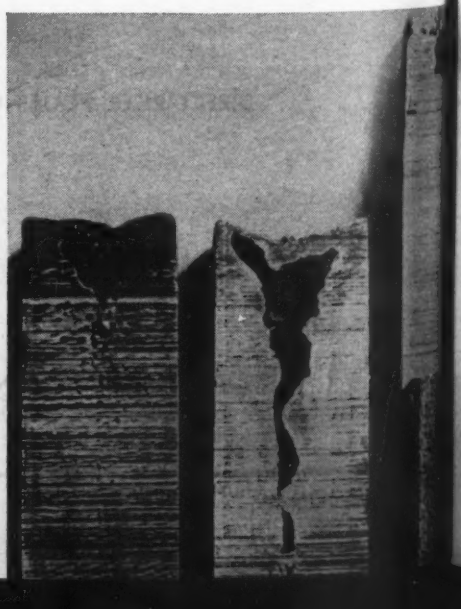
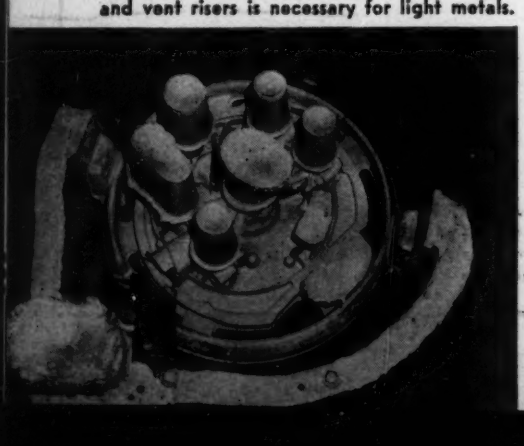


Fig. 15—Motor housing magnesium casting. Excessive venting by the use of open sand and vent risers is necessary for light metals.



dimension as the riser thickness. The purpose of depth of riser below the connection is to have adequate volume of metal to prevent freezing ahead of the riser connections. Of course, the height of the riser must be great enough to prevent the shrinkage in the riser from extending below the riser connection.

Fig. 2 shows a thin wall of core sand between the riser and casting, which sand becomes incandescent and which permits the riser connection to remain fluid. This core plate varies from ½ to 1½ in., depending on section thickness.

This method of riser attachment promotes greater soundness under the riser and permits of its easy removal. Generally, a sledgehammer blow will remove the riser, since the connection is essentially a deep notch.

Use of Chills or Denseners

Chills or denseners are used where risers cannot be conveniently placed, or to control the freezing rate. Their purpose is to do the same job as feeders by freezing the metal about as rapidly as it is poured and, therefore, risers for feeding are unnecessary.

Indeed, when chills are used great care must be exercised that the feeders are so placed that they are not close to chills and do not counteract the chill effect. Chills cause the shrinks to move somewhere else, unless they are placed with due regard to controlled directional solidification.

There are certain points regarding chills that must be kept in mind:

(A) Chills must be clean. Slightly oxidized or rusty chills cause blows to develop in the casting next to the chill. Before each use, therefore, they should be sand blasted and preferably wiped with kerosene to prevent slight rusting in the mold.

(B) They must not burn the casting. Chills are protected from "burning-in" by using chill coatings, of which the writer has found several mixtures to be effective. A commonly used coating is silica flour and linseed oil mixed to a thin-paint consistency. This coating requires heating to dry the surface.

Pouring over a chill or excessive agitation of the metal against the chill tends to cause "burning-in." The aim should be to have the mold poured before the chills have had any time to warm up.

Fig. 19—Extreme application of knock-off risers. Riser is 12-in. in diameter, "hot topped" for a 16-in. by 14-in. by 22-in. section. Riser connection is 2-in. in diameter.

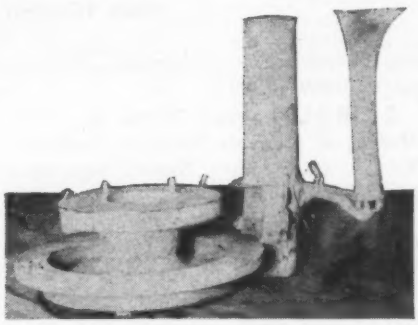


Fig. 18—Suction cover made of Government bronze. This casting was subject to leakage and chills, and risers failed to overcome the difficulty. The method of gating and risering shown finally proved successful. Riser is 3-in. in diameter and stands 10-in. above casting. No riser over the casting. Note strainer core and large fillet where metal enters riser. The coldest metal is farthest from riser and freezing progresses toward the riser thus assuring soundness.

(C) Chills must be large enough to penetrate their densifying effect across the section to be chilled, but not so large and sprawling that they prematurely freeze the metal in the lighter or adjacent sections. Precautions must be taken to prevent chilling the metal beyond the section to be densened, or else the metal cannot feed the densified portion of the casting.

(D) Chills should be on the side or bottom of the mold cavity for most effective chilling.

(E) They are most effective when the metal moves up to them and is not agitated further. Where possible chills should be furthest removed from the gates so that when the metal pours against the chill, freezing commences.

Fig. 17—Destroyer throttle valve steel casting approaching the ultimate in poor design. Note the many light and heavy sections.

(F) Rapid pouring permits the chill to do its most effective work. Rapid pouring permits filling the mold with minimum warming up of the chill. If the chill has had time to warm up considerably before pouring is complete, or before the metal in contact with the chill is quiet, the effectiveness of the chill is reduced.

Venting Mold Cavities

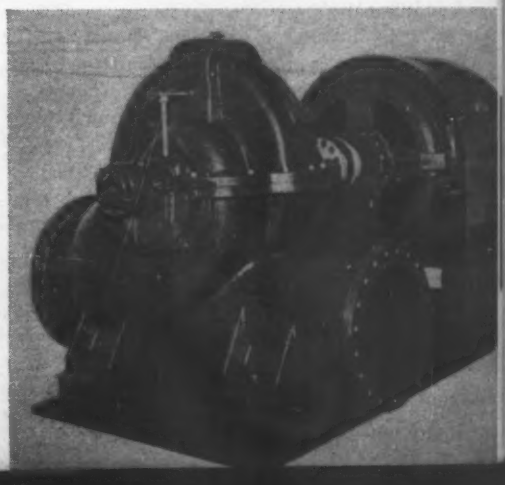
The importance of venting mold cavities is realized by observing the torch effect often blowing out of a riser or vent during pouring. "Whistlers" is a term applied to vents. When pouring light metals, like aluminum and magnesium, special venting is necessary to prevent mold back pressure and to help fill the mold.

All dead-end spots of a mold cavity should be vented so that the metal runs without restraint to every portion of the mold. Also, we must remember that if gas pressure is developed in a mold there is an increased tendency to force gases into the metal and cause defects.

Vents are best designed to be rectangular at the casting to prevent openness and pinholes at the junction with the casting.

A thorough undertsanding and

Fig. 20—Pump castings showing metal joints that would most likely require chilling for pressure tightness.



application of only a few principles is necessary to make sound castings.

(1) Pouring gates should be designed so that clean metal enters the mold quietly and rapidly. Rectangular gate cross sections are preferred to square or round sections.

(2) Controlled directional solidification assists the freezing of the casting to begin at the coldest metal and/or to the thinnest section, and to move progressively toward the hottest metal and/or the heaviest sections.

(3) Design and pour risers so they will assuredly feed castings by conforming to the principles of controlled directional solidification. Allow plenty of pressure to act on the molten metal in a feeder.

(4) Knock-off risers are convenient to remove and they feed adequately.

(5) Chills or denseners are used where risers are impracticable, or where we wish to assist the freezing rate.

(6) Adequate venting of the mold cavity permits filling the mold easily by preventing back pressure. Gas absorption by the metal in the mold is also reduced by good venting.

In a job shop, where a wide variety of castings is made, complete records of the successful molding practice of each casting should be kept. The best record is a photograph of the casting as poured indicating all gates, feeders and chills, and marking all dimensions. At any future date, the casting can be made without trouble by referring to the record.

The future of any foundry, in fact, of the foundry industry, hinges largely upon its ability to make sound castings consistently.

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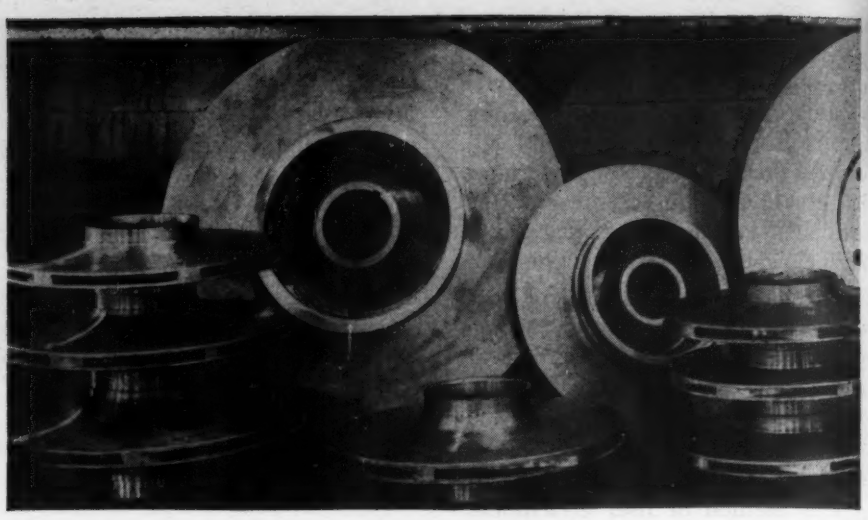

Fig. 21—Pump impellers of large diameter and narrow volutes require special foundry technique. (Courtesy, Le Courtenay Co.)

War Production Conference Held in Chicago

THE Chicago Chapter of A.F.A., in cooperation with other technical and scientific organizations in the area, the War Production Board, and the Army and Navy, staged a War Production Conference on March 30, Stevens Hotel, Chicago.

The conference covered production problems and processes, methods of testing, materials, and personnel problems. The session on foundry practice was held in cooperation with the Chicago Chapter of A.F.A. Dr. R. F. Thompson, Dodge-Chicago Plant, Chrysler Corp., was general chairman of the committee in charge of the session on foundry problems. Two panels were held, one dealing with centrifugal castings, and the other a forum on structural castings.

Cost Committee Will Study Renegotiation

MAJOR Stephen B. Ives, Chief, Financial Analysis Section, Renegotiations Division, Army Service Forces, Washington, D. C., will be the speaker at the session being staged by the Foundry Cost Committee on Friday, April 28, at 2:00 p.m., with R. L. Lee, Grede Foundries, Inc., Milwaukee, Chairman of Cost Committee, presiding, and E. W. Horlebein, Gibson & Kirk Co., Baltimore, Vice Chairman of Cost Committee, acting as Co-Chairman. Major Ives will discuss "Renegotiation in the Foundry." This subject is of great interest because many foundries and allied industries are now being renegotiated by the armed forces. Those who are now in the process of renegotiation, or who anticipate being renegotiated, are urged to attend this session so that they may learn first hand of the problems involved.

Committee to Study Sand Deformation

A NEW committee of the Foundry Sand Research Project has been organized to study the deformation properties of foundry sands. The personnel of the committee is as follows: W. G. Parker, Elmira Foundry Co., Inc., Elmira, N. Y., *Chairman;* James Oschner, Crouse-Hinds Co., Syracuse, N. Y.; George W. Anselman, Goebig Mineral Supply Co., Chicago, Ill.; L. S. Harwood, Harrison Radiator Div., General Motors Corp., Lockport, N. Y., and Robert Doelman, Harry W. Dietert Co., Detroit, Mich.

Chairman Parker will be interested to hear from any persons who have done work on the deformation of foundry sands and who are interested in serving on his committee which will make an extensive study of this sand property.

A.F.A. CHAPTER OFFICERS

Birmingham Chapter

W. Carson Adams,
Chairman

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F. M. Wittlinger, Texas Electric Steel Casting Co., Houston; J. O. Klein, Texas Foundries, Inc., Lufkin; Harry L. Wren, Barada & Page, Inc., Houston.

Book Review

Metals and Alloys Data Book, by S. L. Hoyt. Cloth binding, 7 in. x 10 in., 350 pages, 340 tables, illustrated. Published by Reinhold Publishing Corp., New York. Price, $4.75.

The author has compiled in tabular and graphical form a vast amount of data on metals and alloys and has made it available, along with comments on some of the data, in readable type and in a serviceable-sized volume.

The preface contains an excellent discussion of the interpretation and use of data. The data itself is presented in chapters on test specimens, wrought steels, cast steels, stainless steels, cast irons, heat- and corrosion-resistant casting alloys, non-ferrous alloys, additional metals, and general data. In keeping with the make-up of the book, an adequate index makes it easy for the user to find the data he desires.

Electric Furnace Operations Subject of Safety and Hygiene Meeting

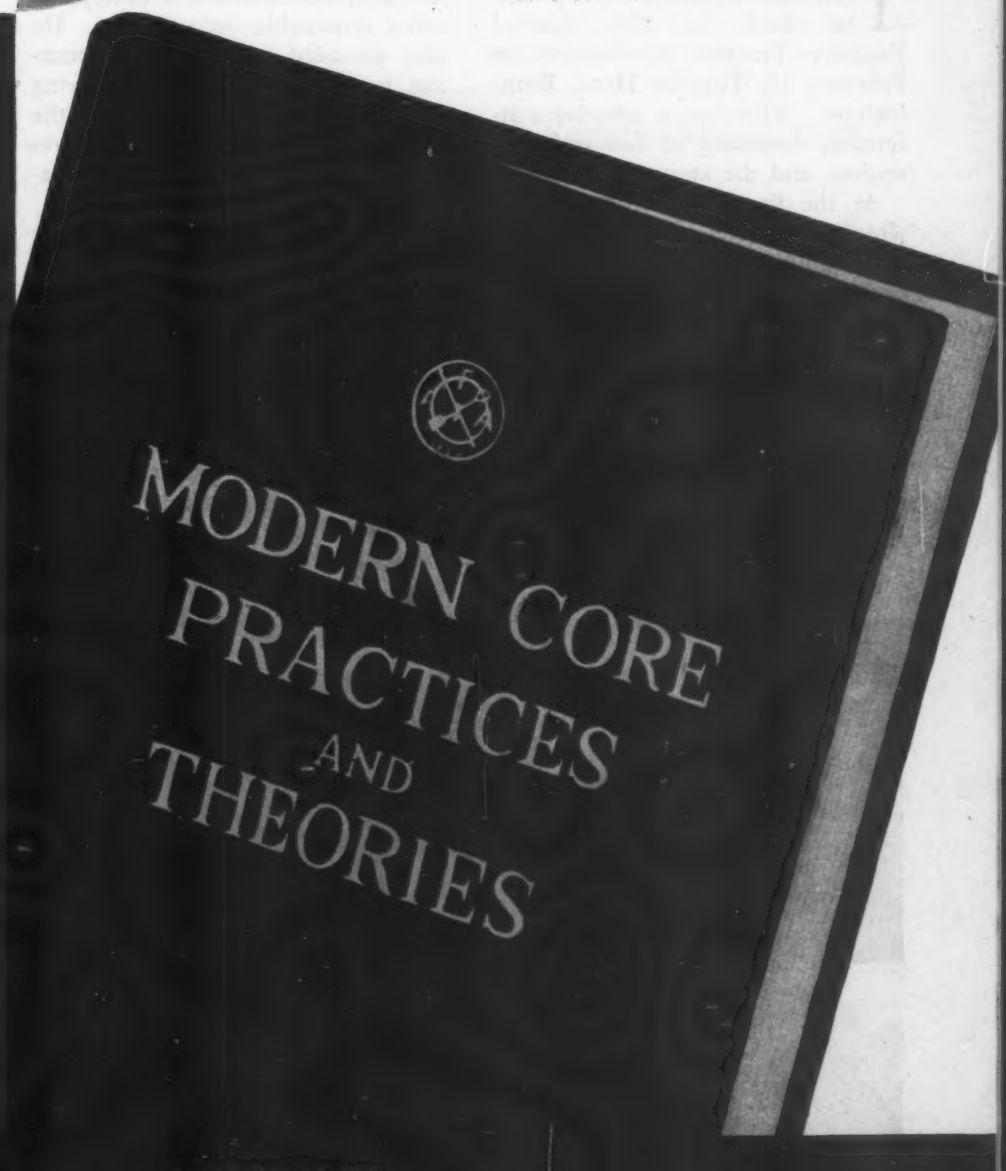
THE meeting on Safety and Hygiene, sponsored by the Industrial Hygiene Codes Committee, at the forthcoming Third War Production Foundry Congress, Buffalo, N. Y., will feature the papers on ventilation of electric furnaces and methods of controlling occupational diseases in the foundry.

The program for the meeting, to be held Thursday, April 27, 2:00 p.m., in the Georgian Room, Hotel Statler, has been arranged by James R. Allan, International Harvester Co., Chicago, Chairman of the A.F.A. Industrial Hygiene Codes Committee. The first speaker on the program will be J. Wm. Fehnel, chemist, Industrial Hygiene Laboratory, Metropolitan Life Insurance Co., N. Y., who will discuss "Fumes Given Off from Electric Melting Furnaces." The subject of ventilating hoods, applied to electric melting furnaces, will be discussed by John M. Kane, engineer, American Air Filter Co., Louisville, Ky. The occupational disease phase of the program will be handled by Dr. E. G. Meiter, Employers Mutual Liability Insurance Co. of Wisconsin, Milwaukee, who will discuss "New Methods of Controlling Occupational Diseases in the Foundry," while James R. Allan will discuss "Observations on Industrial Safety and Occupational Disease Control."

The program arranged for this meeting is an exceptionally timely one, and one which should appeal to many executives who are constantly faced with insurance matters in connection with the operation of their plants. The excellent work done by the Industrial Hygiene Codes Committee of A.F.A. has become recognized nationally, and because of this important phase of foundry operation, foundry executives, who come in contact with the problems to be discussed, are urged to attend this important meeting.

A "FIRST" for Every Foundry-the CORE BOOK

The FIRST book ever published dealing *Exclusively* with Production and Use of Cores in the Modern Foundry



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CHAPTER ACTIVITIES News

See page 83 for list of Chapter representatives whose reports of local activities appear in this issue.

Birmingham Chapter Holds Twelfth Annual Conference

THE Birmingham District Chapter held its 12th Annual Foundry Practice Conference on February 18, Tutwiler Hotel, Birmingham. This was a one-day conference, consisting of two technical sessions and the annual dinner.

At the first technical session, at which J. E. Reynolds, U. S. Pipe and Foundry Co., presided, V. A. Crosby, Climax Molybdenum Co., Detroit, spoke on "Factors Affecting the Mechanical Properties of Cast Iron." Illustrating his talk with slides, charts and graphs, Mr. Crosby specifically outlined the effect of carbon, raw materials and thermal effects in the processing of cast iron. He stated that graphite size, shape and distribution influenced the properties obtainable very greatly. He also discussed such points as pouring temperature, effect of alloying elements, and heat treatments, the latter to produce desired structures to improve wear resistance and machinability.

The second technical session was presided over by J. A. Bowers, American Cast Iron Pipe Co., who introduced C. E. Bales, Ironton Fire Brick Co., Ironton, Ohio, who spoke on "New Developments in Foundry Refractories." Mr. Bales' talk covered not only the use of fire clay and silica brick, but of plastic or monolithic linings, particularly in desulphurizing ladles. Among the various applications for refractories, the speaker stressed the application of certain types of refractories to acid electric furnace bottoms, ladles handling electric steel and gray iron, and for the side-blow converter. Particular emphasis was laid on the methods of laying brick and ramming monolithic linings.

The annual banquet was presided over by W. Carson Adams, Chapter Chairman, and had for its speaker Dr. Raymond R. Paty, president, University of Alabama. Dr. Paty's address emphasized the fact that the retooling of machines at the close of the war will be much easier than the task of "retooling" men. He emphasized the need of education for the millions of veterans who will return home after the war and will require rehabilitation. Dr. Paty praised the foundry industry for its part in accomplishing the "impossible," of converting overnight to all-out war production, but warned that the havoc of a haphazard reconversion can wreck the economy of the greatest nations.

Two groups at the joint Rochester-Western New York meeting, held recently at Hotel Seneca, Rochester

A.F.A. Meeting Being Planned in Nova Scotia

THE Eastern Canada and Newfoundland Chapter of A.F.A. is planning to hold a two-day meeting on May 11 and 12 in New Glasgow, Nova Scotia. The committee of the Eastern Canada and Newfoundland Chapter which is arranging for the meeting, under the chairmanship of W. J. Brown, Robert W. Bartram, Ltd., Montreal, already has circularized all foundries in eastern Canada by letter, and also by special announcements in the monthly meeting notices for the February and March meetings of the Chapter. The meeting will be held in the Norfolk Hotel, New Glasgow, and already

sufficient reservations are at hand to indicate that probably 100 foundrymen will be in attendance.

Replies from the Maritime provinces indicate that the proposed two-day meeting has been received very enthusiastically. A committee under the chairmanship of H. Scott Cameron, Maritime Steel & Foundries, Ltd., New Glasgow, has been formed to take care of arrangements, accommodations, etc.

The program for the meeting is in its formative stages, and will consist of registration, Thursday, May 11, 9:30 a. m., with an afternoon session at 2:00 p.m. on sands and sand mixing. An evening session at 8:00 p.m. will discuss practical molding, with special emphasis on gates and risers. This session will feature F. G. Sefing, International Nickel Co., Inc., New York, who will speak on "A Study of Molding Methods for Sound Castings," and Joseph Nixon, Whitehead Metal Products, Buffalo, who will illustrate various molding problems through the medium of colored slides.

On Friday, May 12, the 9:30 a. m. session will discuss melting and melting practices, those in attendance dividing into three groups for discussion. The 2:00 p. m. afternoon session also will be of a round table character, involving iron, steel and non-ferrous groups. Luncheon and dinner meetings are to be arranged to suit the convenience of everyone present.

Further information with regard to the Nova Scotia meeting will be carried in the May issue of *American Foundryman*.

N.E.O. Hears About Safety and Hygiene

By Pat Dwyer

APPOINTMENT of nominating and auditing committees, tricks of illusion and magic, and an address on the subject of good housekeeping featured the March 9 meeting of the Northeastern Ohio Chapter at the Cleveland Club. For the auditing committee, Chairman J. G. Goldie appointed J. J. Witenhafer, Lake City Malleable Iron Co.; Leon Miller, Osborn Mfg. Co., and Frank Dost, Sterling Foundry Co. For a nominating committee to prepare a slate of officers and directors for the coming year the chairman appointed Jack Tressler, Hickman Williams & Co.; Benjamin D. Fuller, Whitehead Bros.; Elmer Zirzow, National Malleable & Steel Castings Co.; Frank Barton, Fulton Foundry & Machine Co., and Marcel Reyman, Atlantic Foundry.

For the entertainment feature of the evening Jack Lathrop, advertising manager, *The Foundry*, and secretary of the chapter, announced that a popular belief to the effect that the hand is quicker than the eye is entirely erroneous and mistaken. For the following half hour, in demonstrating his claim, he juggled cards and various gadgets and contrivances in a manner that left the spectators convinced in their former belief.

Fortified with various pieces of apparatus the main speaker of the meeting, DeWitt Huffman, safety engineer, Division of Safety and Hygiene, Industrial Commission of Ohio, presented an interesting talk on the general subject of good housekeeping in the foundry, with particular reference to safety and hygiene as related to silicosis. He admitted that probably the majority of foundries are familiar with the dust hazard and have provided equipment to cope with the problem at the shakeout and in the casting cleaning room where the largest volume of dust is generated. The speaker of the evening devoted the concluding part of his address to descriptions of methods which have been found efficacious in maintaining clean air.

Detroit Holds Round Table Meetings

By H. H. Wilder

THE meeting of the Detroit Chapter of the American Foundrymen's Association was held at the Rackham Memorial Building on March 16, 1944. Following the dinner the meetings were in the form of four round table discussions on steel, gray iron, malleable iron and non-ferrous.

A very interesting subject on "Inoculated Irons" was carefully reviewed for the gray iron meeting, with R. G. McElwee, Vanadium Corp. of America, as speaker and W. B. McFerrin, Cadillac Motor Car Div., General Motors, as chairman. The practical and theoretical aspects of this subject were fully described and expounded.

The steel meeting was on "Everyday Science in the Steel Foundry," by F. A. Melmouth, Detroit Steel Castings Co., as speaker and C. E. Silver, Michigan Steel Castings Co., chairman. The discussion was directed to all phases of steel foundry operations.

The malleable iron round table was on the subject of "Malleable Foundry Practice," by S. W. Healy, Saginaw Malleable Iron Div. of General Motors. Chairman for this session was G. L. Galmish, Michigan Malleable Iron Co. Recent developments of malleable operations, as conducted at Saginaw, were thoroughly reviewed.

At the non-ferrous meeting the speaker, Dr. Katherine Chamberlain, Department of Physics, Wayne University, enjoyed the distinction of being the first woman to address the local group. Her topic was "Advantages of Spectrographic Analyses in the Foundry, and Training of Personnel for This Work." The chairman of this session was E. R. Darby of Federal Mogul Corp.

Texas Chapter Hears About Cupola Charging

By H. L. Wren

THE February meeting of the Texas Chapter of A.F.A. was held at the Golfcrest Country Club, Houston, Texas, with F. M. Wittlinger, Texas Electric Steel Castings Corp., Houston, Texas, presiding.

The Chapter, through a Committee on Resolutions composed of Chapter officers, drew up a resolution on the untimely death of Herbert F. Elmer, a director of the Chapter. The resolution was unanimously adopted, and a copy of it was ordered sent to Mrs. Elmer. John Blair, Dedman Foundry & Machine Co., Houston, was appointed a director to serve Mr. Elmer's unexpired term.

The Chapter also appointed an Advisory Committee, consisting of E. H. Trick, Alamo Iron Works, San Antonio, and Ted Williamson, Trinity Valley Iron & Steel Co., Fort Worth, to serve as a local commit-

tee to assist foundrymen in the Texas Chapter area and, specifically, to answer questions which may be submitted through the local office of the Smaller War Plants Corp.

A. W. Gregg, Whiting Corp., Harvey, Ill., was the speaker of the evening, and addressed the meeting on foundry melting units, devoting a majority of his talk to cupola operation, and specifically to charging methods. The address was accompanied by slides, and created a great deal of interest. The Chapter is looking forward to having Mr. Gregg return at a future date to speak to them again.

The next meeting of the Texas Chapter will be held on May 18. The meeting will be devoted to a discussion of non-ferrous foundry problems.

New Director for Northern California

By Geo. L. Kennard

NORTHERN California Chapter held its March 10 meeting at the Engineers Club, San Francisco.

Prior to the meeting, the directors held a short session at which time they elected H. McCaughey, Vulcan Foundry, to fill the unexpired term of A. R. Linn, whose membership in the Association had been terminated.

The directors approved of a proposal to publish and distribute an article on "Drake's Plate of Brass," which was the subject assigned to our late director, Fred L. deSanno, at a non-ferrous program meeting of the Chapter, March 10, 1939.

During the dinner, 101 attendance cards were collected to conserve time for an early adjournment. President Harry Bossi presided and took occasion to welcome Past President Chas. J. P. Hoehn, Enterprise Engine & Foundry Co., and John D. Fenstermacher, Columbia Steel Co., as well as several new members and a host of visitors, who had come to enjoy the excellent program.

Mr. Bossi mentioned activities of the Sand Committee and of the regular attendance at the bi-monthly meetings, which were being held at different foundries after a preliminary inspection of their equipment.

Future programs and mention of all other subjects of interest being concluded, Mr. Bossi regretfully announced the sudden death, on February 17, of our faithful and beloved member, Fred L. deSanno, whose term as director was purposely not filled, as it will expire on June 30.

Dr. C. D. D'Amico introduced the guest speaker, E. Dale Trout, General Electric X-Ray Corp., who used slides to illustrate his subject, "Industrial Application of the X-Ray."

Central Indiana Discusses Core Blowing

By Robert Langsenkamp

RUSSELL F. LINCOLN, Osborn Mfg. Co., Cleveland, Ohio, was the speaker at the March 6 meeting of the Central Indiana Chapter, held at the Athenaeum Turners, Indianapolis. Mr. Lincoln discussed core blowing methods and equipment. He illustrated his talks with slides. Among the subjects discussed by Mr. Lincoln were the principles of core blowing, venting of core boxes, types of vents, sand mixtures used in core blowing, and the most economical air pressure to be used.

Chicago Chapter Holds Round Table Meeting

By Dean Van Order

OVER 250 members and guests attended the March 6 meeting of the Chicago Chapter at the Chicago Bar Association. Chapter President M. F. Becker, Whiting Corp., presided. A. S. Klopp, Hansell-Elcock Corp., introduced the various division chairmen and discussion leaders.

Entertainment was provided by a very capable magician whose slight of hand performance was appreciated by a very attentive audience.

"Pressure Castings in the Brass Foundry" was the topic of the nonferrous division. Chester Faunt, Christenson & Olson Foundry Co.,

Old faces and new among the different groups gathered at Hotel Schroeder, Milwaukee, February 10-11, for the 7th Regional Foundry Conference.

(Photos courtesy John Bing, A. P. Green Fire Brick Co.)

was the chairman and H. M. St. John, Crane Co., was the discussion leader. All types of non-ferrous pressure castings were discussed.

H. A. Foresberg, Continental Roll & Steel Foundry Co., acted as chairman of the Steel Division and E. Johnson, of the same company, was the discussion leader. The subject of gating, risering and pattern rigging was a very worth while topic. The use of "Williams heads" in pattern rigging was a subject of great importance, both to the pattern makers and to the casting makers.

The third division was turned over to the gray iron group. Elmer Carmody, C. C. Kawin Co., was the chairman, and Fred Sefing, International Nickel Co., Inc., New York, acted as discussion leader. One of the big problems of the gray iron industry, "Solidification in Gating and Heading" was reviewed along with a discussion of the improved practices in this field.

Cincinnati Discusses Gray Iron Properties

By Martin F. Milligan

THE February 14 meeting of the Cincinnati District Chapter was held in the Cincinnati Club, with Vice-Chairman W. A. Rengering, Cincinnati Milling Machine Co., Cincinnati, Ohio, presiding. V. A. Crosby, Climax Molybdenum Co., Detroit, spoke on "Factors Affecting the Mechanical Properties of Cast Iron." By the use of slides, charts, and graphs, Mr. Crosby explained how the various physical properties of cast iron were affected by its micro-constituents. He then explained how the proper micro-constituents could be produced in a given iron by proper control of melting, alloy additions and heat treatment.

Detroit Chapter Holds Round Table Conferences

By H. H. Wilder

DETROIT Chapter held its February 17 meeting at the Horace H. Rackham Educational Memorial, Detroit. This meeting was in the form of round table conferences covering malleable, gray iron and magnesium. Following the usual dinner, O. F. Carpenter, Packard Motor Car Co., gave a short talk on "Foundries in Britain." Mr. Carpenter recently returned from a mission to England, and while there, visited many of the foremost foundries.

(Photo courtesy Clyde Thomas, Whiting Corp.)

A familiar setting—the Chicago Bar Association Restaurant—where the Chicago group held its March 6 Round Table Meeting.

Following Mr. Carpenter's talk, the meeting broke up into the previously-mentioned groups. The malleable group discussed "Metallurgical Considerations in Melting Malleable Iron." G. L. Galmish, Michigan Malleable Iron Co., acted as group chairman and R. Green, Detroit Brass & Malleable Works, acted as discussion leader. "How and Why of Quality Control" occupied the attention of the gray iron group under the leadership of E. C. Hoenicke, Eaton Mfg. Co., while A. J. Edgar, technical advisor, Gray Iron Founders Soc., Inc., Washington, D. C., acted as discussion leader. A. W. Stolzenburg, Aluminum Co. of America, was the group chairman for the magnesium session, which discussed "Scrap Recovery." The discussion leader for the magnesium group was W. C. Newhams, Dow Chemical Co., Bay City, Mich.

New Chapter on the Way in East-Central Ohio District

ON January 27, some 70 foundrymen and members of related industries, gathered in the Elks Club, Canton, Ohio, to discuss the organization of a chapter in the East-Central Ohio district. The meeting was organized and staged by a committee composed of the following:

K. F. Schmidt, United Engineering & Foundry Co., *Chairman.*

H. E. McKimmey, Carnegie-Illinois Steel Corp., *Vice-Chairman.*

Otis Clay, Tuscora Foundry Sand Co., *Secretary.*

H. V. Beasley, International Nickel Co.

Earl Brown, Union Metal Co.

I. M. Emery, Massillon Steel Co.

W. W. Hoover, Machined Steel Castings Co.

Chairman Schmidt, of the local committee, presided at the meeting.

The prospects for establishing a chapter were discussed, and the functions of the Association and the service that it renders to its chapter were discussed by F. J. Walls, International Nickel Co., New York, vice president nominate of your Association, and W. B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, a director. Following discussion, it was moved and seconded that a chapter be organized and petitions were circulated to those in attendance. Following the petition signing, Mr. Walls addressed the meeting on "The Foundry of the Future."

Signed petitions for the required number of members for the formation of a chapter were obtained by the organization committee and forwarded to the National Office, from which the petitions were submitted to the Board of Directors. The Board has authorized the formation of a chapter in the East-Central Ohio district and the organization meeting was staged on Thursday, March 30. Details of the meeting

General view of the large assembly attending the dinner meeting of Wisconsin's 7th Regional Foundry Conference.

are lacking because press time of this issue of *American Foundryman*. They will be reported in the May issue.

Western New York Groups In War Conference

By J. Ralph Turner

WESTERN New York Chapter cooperated with the scientific and technical societies in Buffalo in staging a War Production Conference on February 28. The Chapter sponsored a panel discussion on general foundry problems. J. P. Begley, Pratt & Letchworth Co., Inc., and J. H. Sander, American Radiator & Standard Sanitary Corp., were the discussion leaders for steel subjects; E. A. Piper, Pohlman Foundry Co., Inc., and J. C. Goetz, Acme Steel & Malleable Iron Works, for gray iron; and H. R. King, Metal & Alloy Specialties Co., Inc., and J. C. McCallum, McCallum-Hatch Bronze Co., Inc., for non-ferrous subjects.

An excellent display of photomicrographs, radiographs and foundry operations was supplied by Pratt and Letchworth Co. and American Radiator & Standard Sanitary Co. James L. Yates, Worthington Pump & Machinery Corp., Buffalo, acted as chairman of the panel, which was considered to be an exceptionally worthwhile session.

Wis. Chapter Appoints Historical Committee

AS an outgrowth of the Wisconsin Chapter activities with the Old-Timers and Apprentices, highlighted, each year, by a meeting designed especially for those groups, the Wisconsin Chapter has appointed a Historical Committee. The purpose of the Committee is to centralize the activities of those men honored by the Wisconsin Chapter for service to the foundry industry in such a manner that activities can be conducted for these men beyond the Old-Timers' and Apprentices' night.

The primary object of the Committee is to establish a history of the foundry industry in the Wisconsin area. The following men have been appointed members of the Historical Committee:

Chairman—Jack Leisk, Allis-Chalmers Mfg. Co.

Co-Chairman—J. J. McDevitt, S. Obermayer Co.

Secretaries—Bob Woodward, Bucyrus-Erie Co., and Harry Ladwig, Allis-Chalmers Mfg. Co.

The Wisconsin Chapter Historical Committee will welcome any information regarding the early foundry activity in that area and concerning outstanding individuals there.

Leighton M. Long Addresses Toledo Chapter

By R. B. Bunting

LEIGHTON M. LONG, Battelle Memorial Institute, Columbus, Ohio, returned to his old stamping ground on February 22, to address the Toledo Chapter on the problem confronting magnesium alloy castings producers. Mr. Long, who is working with the War Metallurgy Committee, National Research Council, gave examples of cooperative effort in the magnesium casting field between designing engineers, metallurgists and foundrymen, and stated that such cooperative effort might well be copied by all castings producers. He felt that foundrymen should take a more active part in establishing specifications covering quality. The separately cast test bar evaluation for castings must give way to mechanical test procedures that definitely measure the serviceability of the part, he said.

Mr. Long's talk elicited considerable discussion, during which it was brought out that members should submit problems of any nature to the proper A.F.A. committee. It was pointed out that these committees are more than willing to bring such problems into open discussion for the benefit of the industry.

Toronto Discusses Foundry Sand Problems

By G. L. White

IMPORTANCE of proper sand mixtures and their accurate control was emphasized in the address of E. George Brewer, Taggart & Co., Philadelphia, Pa., before a meeting of Ontario Chapter, American Foundrymen's Association, at Hamilton, on January 28.

Mr. Brewer introduced his subject by discussing suitable sand for casting a plate 2-in. thick, and went on to show the effect of certain ingredients upon the sand mix and to emphasize certain points that should be carefully watched with regard to green and dry sand. For the plate casting, the speaker suggested sand with 5-6 per cent moisture (moisture not over the temper point), a permeability of 75-100, and a green strength of about 8 psi. Laboratory determinations of green strength are of little value unless the laboratory and production rammings are comparable. In the preparation of a sand for a job, such as this, the sea coal should be selected to match the sand. In this instance, "C" grade sea coal will not reduce the permeability of the sand too much and will burn at a sufficiently slow rate.

Discussing the use of pitch in dry sand work, the speaker presented the results of tests to indicate the reduction in green and dry permeability and the increase in green and dry strength resulting from the use of pitch in the proportions of 1 to 30 by volume, and 1 to 30 by weight. Too much pitch has a deleterious action on dry sand. Where a high

proportion of pitch is used, such as 1 to 10, the sand grains become glazed by the pitch compound. Tests conducted on the strength of dry sand containing a reasonable amount of pitch have indicated clearly that dry sand does not lose its strength as rapidly as believed by many foundrymen.

Special emphasis was placed upon the necessity for accurate control of the percentage of moisture in sand. One plant that was experiencing trouble with engine castings produced in dry sand found that two of the molders were wet spraying the molds. When this practice was discontinued, no further trouble was encountered. One per cent of water can change every characteristic of molding sand. At the temper point, sand feels neither too wet nor too dry and green sand reaches the peak of its properties.

Brass foundries were rated by the speaker as paying less attention than anyone else to their heap sand. Little sand control is practiced in brass foundries and most plants use sand too fine for the work they are doing. Some brass production foundries have increased permeability securing better feeding of risers and coaxing shrinks up into the risers.

Following the address the speaker answered a wide variety of questions on sand problems, clearing up quite a number of points, troublesome to various members. In conclusion, he warned that water was the greatest evil in the foundry industry, accounting for 90 per cent of foundry losses.

Casting Design Subject at Western New York

By M. F. Sproull

THE March 3 meeting of the Western New York Chapter was held at Hotel Touraine, Buffalo, with Frank E. Bates, Worthington Pump & Machinery Corp., Buffalo, chapter chairman, presiding. "Casting Design" was the subject discussed by E. A. Piper., Pohlman Foundry Co., Inc., Buffalo. T. H. Burke, Otis Elevator Co., Buffalo, acted as technical chairman of the meeting and introduced the speaker.

Mr. Piper stated that design is one of the greatest variables in the foundry, and that design was one of the basic causes for many defective castings, but that the foundrymen did little about it. He pointed out that other industries had educated their customers to proper design, but that the foundry industry was lax. Several slides were shown, indicating what other industries are doing to educate their customers, and the speaker also showed several other slides illustrating the difference in cost for the same design when cast and when made by other fabricating processes. The speaker then discussed the elementary points which must be taken into consideration in designing castings, showing that there may be several stresses in each job, but that tension and compression forces must equalize each other. He also showed that the last member of a casting to solidify always was in tension. He closed his talk by showing practical examples of how castings were redesigned to eliminate losses from tearing, cracking and distortion.

Rochester Chapter Discusses Aluminum

By D. E. Webster

THE March 8 meeting of the Rochester Chapter, at the University of Rochester, was devoted to the subject "Non-Ferrous Foundry Practice."

Following dinner at the Rush Rhees Library, the group of about fifty foundrymen met at the Geology Building, on the River Campus, to hear Charles Vaughn, Ritter Co., and Vice-President of the Rochester Chapter, discuss recent trends in the metallurgy of aluminum alloys, particularly those alloys of the heat-treatable type.

Refinements in melting practice, with controlled furnace atmospheres, have tended to step up the quality of those aluminum alloys so essential in present day aircraft production. X-Ray has also taken a prominent place in non-ferrous production, not only as a means of detecting hidden defects, but also as a practical tool for control in production.

Correct molding sand preparation, and the proper design and placing of gates and risers, have a marked effect on the physical properties of the finished casting: and it is essential that newly designed castings be studied carefully to assure a product free from internal defects or contamination.

Controlled heat treatment, in addition to proper foundry practice, also has aided materially in the improvement of physical structures.

Two Meetings Staged by So. Calif. Chapter

By Blaine Bender

ALTHOUGH the attendance was somewhat smaller than on previous meetings the members of the Southern California A.F.A. chapter had interesting and enjoyable meetings, in both January and February, at the Elks Club in Los Angeles.

The highlight of the January meeting was the illustrated talk given on methods of dust control in the foundry.

In February, the attention was excellently held during a talk on shakeouts in the foundry plus the action movies of the product. One of the main events of the evening, however, came when several "A.F.A. Songsters" rose to the occasion and entertained their fellow members with some favorite songs accompanied by the accordion player. We are of the opinion that nearly all members enjoy seeing and hearing members of their own organization, flavored here and there with group singing of old favorites under the direction of a good song leader. At any rate the February meeting will be remembered for some time to come.

Group Meeting at East. Canada & Newfoundland

By A. E. Cartwright

A VERY successful evening was experienced in the first group discussion program attempted by the Chapter, which took place at the Mount Royal Hotel, Feb. 18. The meeting appeared doomed to probable failure owing to a sudden strike of all tramway and bus services, but such was the interest and enthusiasm, that 99 members and guests attended, many of them at considerable inconvenience and with doubt as to means of getting home afterwards.

Four groups, steel, cast iron, bronze, and French-speaking on general foundry problems were in

four separate rooms. The French-speaking group was the largest with about 45 present, steel next with 27, cast iron and bronze about equally dividing the remainder. Chairmen and discussion leaders in each group did splendid work and many gated castings were brought in and thoroughly discussed along with related foundry topics.

Preparations are going forward for a two day conference in Nova Scotia and preliminary indications are that this will be well attended by representatives from all provinces in the Chapter's territory.

Chapter membership has passed the goal set for the season of 250 by an extra three, and Chairman Delahunt has called for an extension of the original objective to 275.

Malleable Iron Discussed At Quad City Meeting

By H. L. Creps

GEORGE A. SCHUMACHER, Benton Harbor Malleable Industries, Benton Harbor, Mich., was the speaker at the February 21 meeting of the Quad City Chapter, held at the Fort Armstrong Hotel, Rock Island, Ill. Mr. Schumacher spoke on "Melting and Annealing of Malleable Iron." Prior to Mr. Schumacher's talk, a moving picture review of the construction of the Alcan Highway was shown. In his talk, Mr. Schumacher reviewed the progress of the malleable industry, both from the melting and annealing standpoints. He began with the old hand-fired air furnace down through the powdered coal-fired air furnace, progressing to the duplexing system, stressing the value of exchanging information, as is done today in contrast to the secrecy which was practiced years ago. He stated that tremendous savings and improvement in quality had been achieved through the use of the duplexing method.

The importance of making chemical analyses on each incoming shipment of raw material was stressed. He emphasized that, because of the occasional appearance of foreign elements in some raw materials, particularly scrap, complete supervision was necessary to eliminate serious trouble. Regarding the annealing of malleable iron, the speaker reviewed the progress made in lowering annealing time. He pointed out that the present-day cycle of 22 to 40 hours was a remarkable contrast to the old period of ten days.

Round Table Meetings Are Held at St. Louis

By J. H. Williamson

WITH Chapter Vice Chairman E. Eugene Ballard, National Bearing Metals Co., St. Louis, presiding, the regular monthly meeting of the St. Louis District Chapter was held at the Hotel DeSoto, February 10.

Following a showing of a war film, those attending split up into a series of discussion groups, dealing with steel, gray iron and non-ferrous problems. Ronald T. Leisk, American Steel Foundries, acted as chairman of the steel group, with George T. Baebler, Key Co., E. St. Louis, acting as discussion leader on the subject of "Sand Control in a Continuous Operation Steel Foundry." C. B. Shanley, Semi-Steel Casting Co., St. Louis, acted as chairman of the gray iron group, which discussed "Gating and Risering of Gray and Alloyed Iron Castings." The non-ferrous group, over which Francis T. O'Hare, Central Brass & Aluminum Foundry Co., St. Louis, presided, and William M. Baxter, National Bearing Metals Corp., St. Louis, acted as discussion leader, discussed "Temperature and Analysis Control of Brass and Bronze."

Interest in this type of meeting was shown by the fact that all three of the round table sessions ran past the usual adjournment time.

Ontario Chapter Holds Group Meetings

By G. L. White

A SUCCESSFUL group meeting, featuring gray iron, non-ferrous and malleable divisions, was held by the Ontario Chapter at the Royal York Hotel, Toronto, on Friday, February 25.

At the general meeting, prior to the group discussions, the slate of nominations for 1944-45 was presented. A number of new members were welcomed into the Chapter and J. H. King, chairman of the membership committee, reported that the Ontario Chapter stood third in number of company members among the 27 chapters in the organization.

Speaking in the gray iron group, under the chairmanship of A. Bock, Sheldon's, Ltd., H. Fairfield, Bureau of Mines, Ottawa, gave a brief description of the new metallurgical laboratories of the Bureau of Mines. Mr. Fairfield indicated something of the achievements of metallurgical research during the war, and reviewed future possibilities of research in the foundry industry.

The Bureau of Mines has been called upon to undertake a large number of metallurgical investigations, relating to war production. While the results are in many cases secret, it can be said that the achievements of the laboratories are providing industry with a new appreciation of their worth to metal industries in Canada.

The speaker pointed out that research was moving into the foundry industry to a steadily increasing degree. Many foundries at present are not certain what optimum conditions are for many phases of their operations. By thorough research into operations and the application of this process, research or quality control, foundries have achieved reductions in scrap even on difficult castings to such low levels as two-tenths of one per cent.

In the non-ferrous group, under the chairmanship of J. Dalby, Canada Metal Co., Ltd., E. G. Jennings, Ottawa, discussed wartime non-ferrous metals. He dealt particularly with tin bearing alloys and the manganese silicon, and aluminum bronzes. The characteristics of A, B, C, D, and E tin-containing alloys were discussed and important suggestions were made as to best foundry practice in these various grades.

Outlines were also given of the principal grades and types of manganese bronze, silicon bronze, and aluminum bronze, and the speaker discussed briefly foundry practice and the characteristics to be achieved in each.

In the malleable group, under the

leadership of J. Cunningham, International Malleable Iron Co., Ltd., H. Bornstein, Deere and Co., Moline, Ill., spoke on "Malleable and Pearlitic Malleable Castings." This talk by Mr. Bornstein covered malleable practice in considerable detail.

The speaker pointed out that malleable melting in foundries, melting under 50 tons daily, is accomplished principally with powdered coal-fired reverberatory furnaces, while foundries with higher production use one of the duplex processes, the most common of which is the cupola-air furnace type.

Charges, melting procedures, refractories, and the type of iron produced were considered. The speaker said periodic annealing ovens are not very accurate and require long cycles on account of large temperature differences. Short cycle ovens give greater uniformity and better control, operating on 15 to 35 hours total cycle. The atmosphere surrounding castings during anneal is very important and the effect of constituents in the iron must be given consideration.

Mr. Bornstein discussed pearlitic malleable including four classes: (1) Arrested Anneal in which the normal analysis of white iron is subjected to a suitable cycle; (2) Complete Anneal of normal analysis white iron followed by pre-heating and drawing to achieve pearlitic malleable characteristic; (3) Use of normal annealing cycle with additions to the iron of annealing retarders of which manganese is the most common; (4) The addition of manganese, copper and molybdenum, with graphitizing at 1700° F., air quenching from 1000-1200° F., reheating and spheroidizing at 1280° F.

Reichert Speaks on Sand At Chesapeake Chapter

By G. F. Kuhn

THE February meeting of Chesapeake Chapter was attended by 76 members and friends who were entertained by our speaker, Mr. W. G. Reichert, W. G. Reichert Engineering Co., Newark, N. J., whose subject was "The Control of Sands."

As a preliminary, Mr. Reichert outlined the general conditions influencing the production of good castings from the standpoint of the engineer who designs the part to the molder who must make the casting. After the part or pattern reaches the molder, sand becomes one of the most important functions.

The properties which constitute a good molding sand were outlined and discussed. The use of cereal binders, sea coal, pitch, bentonite and various other additions were listed as well as the good and bad effects encountered with these additions. A caution was added as to the use of too high a percentage of additive agents. Some foundrymen find 1 or 2 per cent of an agent beneficial and decide that by adding more, they can still better the results, finally finding themselves in trouble.

When asked as to the trend of synthetic sand, Mr. Reichert felt it to be strictly a matter of economics but in the future, it will find more and more application to large and difficult castings with natural sands finding use for small castings.

Among our guests were Herman Good, Textile Machine Works, Chairman of the Reading Foundrymen's Association, and Ben Bartell, Chairman, Philadelphia Chapter of A.F.A.

Twin City Hears Talk on Core Binders

By Alexis Caswell

THE Midway Club, St. Paul, Minn., was the scene of the February 24 meeting of the Twin City Chapter, with Clifford Anderson, Vice President, Crown Iron Works, Minneapolis, Chairman of the Chapter, presiding.

J. A. Gitzen, president, Delta Oil Products Co., Milwaukee, spoke on "Binders, Cores, Sand." The speaker covered the various types of sand, their properties and effects on cores. He emphasized the necessity of drying cores properly and of correct temperature and time of baking cycle. He also discussed various types of binders, their characteristics and effects.

Chairman Anderson presented a report from the St. Paul Vocational High School, stating that the situation confronting the school because of insufficient students in the foundry course was becoming difficult. H. M. Patton, American Hoist & Derrick Co., St. Paul, Minn., explained that the matter had been discussed with the Vocational School by a number of the St. Paul foundries, and that further consideration would be given the matter.

Reporters on Chapter Activities

Officers and representatives of A.F.A. chapter and other foundry groups who report on local activities in this issue, are identified below:

Central Indiana—Robt. Langsenkamp, Langsenkamp-Wheeler Brass Works, Inc., Indianapolis; Chapter Secretary.

Chesapeake—Geo. F. Kuhn, Gibson & Kirk Co., Baltimore, Md.; Chapter Reporter.

Cincinnati—Martin F. Milligan, The Lunkenheimer Co., Cincinnati, Ohio; Chapter Secretary.

Detroit—H. H. Wilder, Vanadium Corp. of America, Detroit, Mich.

Eastern Canada and Newfoundland—A. E. Cartwright, Robert Mitchell Co., Ltd., St. Laurent, Que.; Chapter Director.

Northeastern Ohio—Pat Dwyer, *The Foundry*, Cleveland, Ohio.

Ontario—G. L. White, Westman Publications, Ltd., Toronto; Chapter Secretary-Treasurer.

Quad City—H. L. Creps, Frank Foundries Corp., Moline, Ill.; Chapter Secretary-Treasurer.

St. Louis—J. H. Williamson, M. A. Bell Co., St. Louis; Chapter Secretary-Treasurer.

Toledo—R. B. Bunting, Bunting Brass & Bronze Co., Toledo; Chapter Secretary-Treasurer.

Western New York—J. Ralph Turner, Queen City Sand & Supply Co.; Buffalo, N. Y.; Chapter Secretary.

Twin City—Alexis Caswell, Manufacturers' Assn. of Minneapolis, Inc., Minneapolis, Minn.; Chapter Secretary-Treasurer.

Rochester—D. E. Webster, American Laundry Machinery Co., Rochester; Chapter Secretary-Treasurer.

Southern California—Blaine Bender, Advance Aluminum & Brass Co., Los Angeles.

Texas—H. W. Wren, Barada & Page, Inc., Houston, Texas; Chapter Secretary-Treasurer.

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